United States
Department of
Agriculture

Forest
Service

Intermountain
Region

Wasatch-Cache
National Forest

February 2004

North Rich Allotment Final Environmental Impact Statement

United States
Department of
Agriculture

National Agricultural Library

FINAL ENVIRONMENTAL IMPACT STATEMENT

NORTH RICH CATTLE ALLOTMENT

Wasatch-Cache National Forest
Logan Ranger District
Cache and Rich Counties, Utah

February 2004

Lead Agency: USDA Forest Service

Wasatch Cache National Forest
8226 Federal Building
125 South State Street
Salt Lake City, Utah 84138
(801) 524-3900

Responsible Official:

Robert A. Cruz
Logan Ranger District
1500 East Highway 89
Logan, Utah 84321
(435) 755-3620

For Futher Information Contact:

Evelyn Sibbernsen
Logan Ranger District
1500 East Highway 89
Logan, Utah 84321
(435) 755-3620

ABSTRACT: This Final Environmental Impact Statement documents the analysis of four alternatives developed for possible management of the 27,000-acre North Rich Cattle Allotment administered by the Wasatch-Cache National Forest. Alternative A is the "No Action" alternative and can be described as the "continuation of current management under direction of the Revised Forest Plan". Alternative B is the proposed action and includes a reduction in number of livestock grazed, implementation of a rest rotation grazing system, vegetation treatments in aspen, sagebrush, and tall forb communities, and fencing of three riparian areas. Alternative C is a "no grazing" alternative under which grazing would be eliminated from the North Rich Allotment after three years. A Draft Environmental Impact Statement was released for public comment in June 27, 2003. Based on comments received on the draft, an additional alternative and new information were added. Alternative D, the additional alternative, includes a two-pasture, deferred rotation grazing system.

Summary

Introduction

This summary presents an overview of the Final Environmental Impact Statement (FEIS) prepared for the management of the North Rich Allotment. The information includes the issues brought forward in the analysis and a summary of the effects of the four alternatives.

The Logan District of the Wasatch-Cache National Forest (WCNF) proposes to authorize grazing on the North Rich Allotment at a level and in a manner consistent with direction set forth in the Revised Forest Plan, the Rangeland Health EIS, and other applicable laws and regulations.

The proposal includes vegetation treatments and structural improvements designed to improve unacceptable resource conditions on the allotment and move vegetation and watershed conditions within the North Rich Allotment toward desired conditions.

Purpose and Need

According to historic records for the allotment (available in the project file), unacceptable resource impacts have occurred during the more than 100-year history of domestic grazing within the North Rich allotment. Although there has been some improvement, existing resource conditions in many areas are still unsatisfactory and not moving toward desired conditions.

Decisions to be Made

In consideration of this analysis, the Forest Service will decide whether or not to authorize grazing on the North Rich Allotment. The decision could involve the proposed action or any of the other alternatives in their entirety, or could include specific portions of the proposed action or any alternative. If the decision is made to authorize grazing, the decision may include the grazing system, season of use, utilization standards and guidelines, ground cover standards, associated improvements, mitigation measures, and monitoring to be included in the revised AMP.

The decision will be made by the Logan District Ranger and will be documented in a Record of Decision, subject to public review and appeal.

Issues

The following are the issues identified through internal (Forest Service) and external (public) scoping.

Aquatic and Semi Aquatic Species

- How would cattle grazing under the proposed action or any of the alternatives affect aquatic habitat and aquatic species found to exist within the waters of the North Rich Allotment?

- How would cattle grazing affect Bonneville cutthroat trout populations and how would the provisions of the Conservation Agreement and Strategy for the Bonneville Cutthroat Trout be carried out?

Measurement indicators used to compare alternatives:

a. The degree to which potential aquatic habitat is provided or protected through restoration of degraded riparian areas.

b. The extent of protection afforded to Bonneville cutthroat populations.

Heritage Resources

- How would implementation of the proposed action or any of the alternatives affect heritage resources within the North Rich Allotment?

Measurement indicator used to compare alternatives:

a. The degree of protection provided for known and unknown archaeological sites.

Recreation

- How would the proposal or any of the alternatives affect summer and winter recreation experiences in the area within the North Rich Allotment (referred to as the Sinks Road vicinity)?

Measurement indicator used to compare alternatives:

a. The degree to which summer and winter recreation experiences in the Sinks Road vicinity are affected by the presence of livestock and by fences constructed for range management under the proposed action or alternatives to it

Socioeconomics

- What positive or negative socioeconomic impacts would occur under implementation of the proposed action or any of the alternatives?

Measurement indicator used to compare alternatives:

a. The relative degree to which North Rich permittees and Rich County are affected by the proposed action or alternatives to it

Vegetation

- How would implementation of the proposed action or any of the alternatives affect upland and riparian vegetation condition and trend?
- How would implementation of the proposed action or any of the alternatives affect Threatened, Endangered, or Forest Service Sensitive plant species?

Measurement indicators used to compare alternatives:

a. The rate of change and degree to which ground cover and species composition are improved through the proposed action or alternatives to it

b. The degree to which sensitive or rare plants are affected by the proposed action or alternatives to it

Water and Soils

- How would the proposal or any of the alternatives affect riparian and wetland vegetation, soil and water conditions such as wetland function, soil productivity, stream channel and bank stability, and water quality?
- How would the alternatives affect soil productivity of uplands within the allotment?

Measurement indicators used to compare alternatives:

a. The amount and rate of improvement of degraded soil, water, and riparian conditions where they exist, through implementation of the proposed action or alternatives to it

b. The rate and degree to which soil productivity is improved by the proposed action or alternatives to it

Wildlife

- How would the proposed action or any of the alternatives affect wildlife species or their habitat? This includes USFWS-listed Threatened, Endangered, Proposed and Candidate species, USDA Forest Service Intermountain Region-listed

Sensitive species, Management Indicator Species (MIS), and general species of local concern.

Measurement indicators used to compare alternatives:

a. The degree to which threatened or endangered wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives to it

b. The rate and degree to which sensitive wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives to it

c. The degree to which neo-tropical migratory birds are affected by the proposed action or alternatives to it

Issues Dismissed

The following issues were identified by the ID Team as not within the scope of analysis, not pertinent to the development of a reasonable range of alternatives, and not necessary for the evaluation of environmental effects:

- The "suitability" of grazing on the North Rich Allotment or other portions of the Logan District.

Rangeland suitability determinations for the WCNF are made at the forest planning level. Forest planning regulations, found at 36 CFR 219.20 regarding the grazing resource, require a determination of rangeland suitability in forest plans. Criteria for assessing rangeland capability and suitability are identified in the Intermountain Region Planning Desk Guide (R-4 Grazing Protocol, 2/20/98). The suitability of the North Rich Allotment was established in the Revised Forest Plan (US Forest Service 2003).

The scope of this analysis is limited to determining if and at what level grazing is appropriate and acceptable to be consistent with laws, regulations, standards and guidelines for the North Rich Allotment (determined to be "suitable" in the forest planning process).

- What are the costs to the government for implementing the proposed action or any of the alternatives?

Forest Service Range Project Effectiveness Analysis Handbook 2209.11 (USDA Forest Service 1998), effective April 1, 1998, noted that following a Washington Office and Regional review the direction to complete an economic effectiveness analysis was no longer applicable at the project level.

An Economic Suitability Analysis was conducted for the Revised Forest Plan and can be found in Appendix B-9 (USDA Forest Service 2003). The analysis meets requirements for an economic suitability analysis for livestock grazing at the Forest level. The analysis gives the deciding official additional information regarding the allocation of lands to livestock grazing management. However, as noted in the Revised Forest Plan, in an appeal decision for the Rio Grande National Forest in Colorado, on the topic of Livestock Grazing Capability and Suitability Determination, the Forest Service Chief stated "I do not...agree with the appellant's contention that if suitability determination reveals that non-grazing values outweigh grazing values, the area should in all instances be deemed unsuitable for livestock grazing." Similarly, the decision in this analysis is not based solely on economic considerations, but on the totality of environmental effects as discussed in Chapter 4.

One of the issues addressed during scoping concerned the costs to the government for administering the grazing program on the Logan District and implementing the proposed action or any of the alternatives in this EIS as compared to the benefits received. Some people feel that the range management program should demonstrate economic efficiency and "pay its way" as a condition to issuing grazing permits.

There are costs associated with analyzing, implementing, and administering range management programs in the Forest Service. The Forest Service administration directs National Forests to provide a range management program where capable and suitable lands are present. As such, the Forest Service accepts the costs of doing business (administration, resource monitoring and analysis, NEPA planning, etc.) for that directed program.

While financial integrity and accountability of all resource management programs in the Forest Service is a program management priority, the Forest Service is constrained in its ability to positively affect the financial efficiency of agency grazing projects. Grazing fees for permitted livestock use on National Forest Systems lands are designated by Congress in accordance direction incorporated in FLPMA, Sect. 401, and 36 CFR 222.10(a). Under this regulation, currently 100 percent of Forest Service fees are returned to Regions and Forests from which they are generated to be used for range betterment on the allotments from which they were generated. However, under these same regulations, up to one-half per centum of these receipts could be allocated to the U.S. treasury, and not returned to the Forest Service.

These same regulations place a limit on the fee the Forest Service can charge for livestock grazing on National Forest System lands. Federal grazing fees are established through an approved formula. As a result, because the Forest Service is limited in its ability to affect financial returns by increasing grazing fees, and is subject to fluctuations in return of grazing receipts based on Congressional determination, it is limited in its ability to create a positive financial return as measured by traditional economic criteria. Based on the constraints of federal laws and regulations affecting the financial efficiency

of the Forest Service grazing program, economic efficiency as a condition for grazing authorization is considered outside the scope of this analysis. See Appendix H.

- How does recreation use affect rangeland resources and facilities within the allotment?

Recreationists within the allotment have the potential to accidentally or sometimes purposefully damage or destroy allotment fences. They also might leave gates open allowing livestock access to unauthorized areas. Permittees become frustrated when they must bear the consequences of these actions. Some have also voiced concern that recreation users (e.g., campers, ATV riders) are causing a share of the damage to riparian areas and that excluding only cows from riparian areas will not bring about much improvement in riparian conditions.

Riparian fencing, where proposed, will exclude cattle use as well as human use of these riparian areas. Although it is an important issue, disrespectful, illegal, and unauthorized use of ATVs (such as leaving gates open, dispersing cows, or riding on closed trails or roads) is an issue that is beyond the scope of this analysis. This issue must be dealt with in the context of travel planning. Decisions regarding ATV use and enforcement of the Travel Plan are not made within the scope of the North Rich EIS and ROD.

Summary of Alternatives

Table S.1 Comparison of differences among Alternatives A (No Action), B (Proposed Action), C (No Grazing), and D (Deferred Rotation).

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Permitted Numbers	Approximately 1260 head	Approximately 1/3 reduction from current numbers (about 800 to 900 head), then monitor for adjustments	Approximately 1260 head until grazing is eliminated from the allotment in 3 years, then no grazing	Approximately 1260 head, then monitor for adjustments
Grazing System	Season-long within the entire allotment, 80 days, during June 16-Sept. 30	Rest rotation, 3-pasture system, 80 days, during June 16-Sept. 30	Season-long within the entire allotment, 80 days, during June 16-Sept. 30 for 3 years, then no grazing	2-pasture, deferred rotation, 80 days, during June 16-Sept 30
Utilization	50 percent use on uplands in satisfactory condition; 30-40 % use on uplands in unsatisfactory condition; riparian greenline stubble heights at the end of the growing season of 4-5 inches on Class 2 riparian areas and 5-6 inches on Class 1 riparian areas	Same as Alternative A	For 3 years, same as Alternative A, then no grazing	Same as Alternative A
Herders	2 herders – 40 hours a week	2 to 4 full-time herders, 7 days per week, for the first year then number of full-time herders would be adjusted according to implementation needs	2 herders - 40 hours a week until grazing is eliminated	Same as Alternative B

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Structural Improvements	Construction of about 2 miles of allotment boundary fence annually and annual maintenance of ponds and existing fences	Construction of about 1 mile of pasture fence and about 1 mile of allotment boundary fence annually; annual maintenance of ponds and fences; about 16 acres riparian fencing (as shown in Table 2.1); Total fence needed is 12 miles boundary fence and 9 miles pasture fence	Annual maintenance of ponds and existing fences until grazing is eliminated	Same as Alternative B (except that total fence needed is 12 miles boundary fence and 5 miles pasture fence).
Vegetation Treatments	None	About 600 acres sagebrush, 42 acres tarweed, and 800 acres aspen would be treated (as shown in Table 2.2)	None	Same as Alternative B
Noxious Weed Treatment	About 50 acres sprayed each year	Same as Alternative A, but with emphasis on eradicating spotted knapweed.	Same as Alternative A, but with emphasis on eradicating spotted knapweed.	Same as Alternative A, but with emphasis on eradicating spotted knapweed.

Summary of Effects

Table S.2 Comparison of the effects of Alternatives A (No Action), B (Proposed Action), C (No Grazing), and D (Deferred Rotation).

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #1 – Aquatics **a. Effect on aquatic species and their habitat**	No improvement of degraded riparian conditions outside of exclosures, due to continuation of season-long grazing and concentration of cattle in these areas. Protection for boreal toad is provided by the exclosure around Tin Cup Spring.	Improvements will be observed in riparian areas due to lower stocking rate, a rest-rotation grazing strategy, and riparian fencing projects. Protection for boreal toad is the same as Alternative A.	Riparian areas will recover the quickest under this alternative. Gradual loss of still-water habitat (stock ponds) will occur as stock ponds dry up, since they will no longer be maintained for cattle grazing. Protection for boreal toad is the same as Alternative A.	Small improvement in riparian conditions due to a deferred grazing system and riparian fencing projects. Recovery will be slower than Alternatives B and C, but quicker then Alternative A. Protection for boreal toad is the same as Alternative A.
b. Effect on Bonneville cutthroat trout	Not likely to impact individuals or habitat. Protection from cattle grazing is provided by the Hells Hollow Exclosure (entire population is located within the exclosure).	Same as Alternative A	Not likely to impact individuals or habitat. Approximately two miles of riparian fencing (Hells Hollow Exclosure) would be removed after grazing is eliminated.	Same as Alternative A
Issue #2 – Heritage Resources **a. Effect on heritage resources**	Potential impacts to known and unknown archaeological sites will continue from grazing in riparian areas.	Riparian fencing would protect sensitive riparian areas (where heritage resources are typically found) from cattle trampling.	Direct effects to the known archaeological sites will largely diminish as grazing is eliminated.	Same as Alternative B

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #3 – Recreation **a. Effect on recreation experiences and opportunities**	Recreation experiences would continue to be affected for those who prefer not to see or interact with cows while hiking, biking, sightseeing, or on other recreation outings.	Recreation experiences would improve for those individuals who do not like to see or interact with cattle since there would be locations available within the allotment that are rested from cattle grazing each year. Winter recreation experiences (snowmobiling) may be negatively affected by 9 miles of newly-constructed pasture fences.	Recreation experiences would improve after grazing is eliminated, for those who do not like to see or interact with cattle while on recreation outings.	Effects would be essentially the same as Alternative A because the evidence of cattle grazing would still be visible, since each pasture would be rested only a portion of each year. The potential for snowmobile conflicts with newly-constructed pasture fences would be slightly less than Alternative B because only 5 miles of pasture fence would be constructed.
Issue #4 – Socioeconomics **a. Effect on permittees and the local economy**	Most beneficial to local communities and permittees.	Permittees responsible for costs for additional 2 to 4 herders for the allotment and labor for 21 miles of fence construction. Implementing rest-rotation pasture system would require permittees to reduce their stock by about 1/3, thus they can expect reduction in income by approx. 33%. Impact on local communities would be minor.	Greatest negative impact on permittees and local communities. Eight grazing permits would be phased out. Some permittees may go out of business.	Permittees responsible for costs for additional 2 to 4 herders for the allotment and labor for 17 miles of fence construction. There would be no reduction in livestock numbers, which would maintain income based on number of head. Impact on local communities would be minor.

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #5 - Vegetation **a. Effect on upland vegetation condition and trend**	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas remain lower than the desired condition. Very slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a low to moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to be eradicated.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a low to moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.
b. Effect on T,E,S and recommended Sensitive plant species	Little or no effect	Little or no effect	No effect	Little or no effect

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #6 – Watershed, Soils, Wetlands, Riparian **a. Effect on soil and water and riparian conditions**	Slowest rate of improvement of soil and water resources because of no change from current management except for lowered utilization standards. Lowered utilization standards for unsatisfactory condition rangeland will result in some improvement to soil condition and ground cover. Season-long grazing would continue to degrade riparian areas because livestock tend to concentrate and linger in these areas.	A faster rate of improvement over Alternative A will occur from rest rotation grazing and better herding practices. Sagebrush, tarweed, and aspen treatments will result in rapid improvements in treated areas. Improvement projects such as fencing will rapidly improve specific riparian areas.	All upland areas will see a slow improvement because of removal of soil compaction from livestock trampling. Water quality will improve from reduced amounts of animal waste and sediment entering streams from livestock. All riparian areas will improve fastest under this alternative.	A moderate rate of improvement over Alternative A will occur from deferred rotation grazing and better herding practices. Sagebrush, tarweed, and aspen treatments will result in rapid improvements in treated areas. Improvement projects such as fencing will rapidly improve specific riparian areas.
b. Effect on upland soil productivity	Soil productivity will improve in areas of unsatisfactory condition rangeland mainly from lowered utilization standards for these areas. The soil productivity will likely stay the same or improve slowly in the remainder of the upland areas because no change in management from current management.	Soil productivity will improve faster than Alternative A because of rest rotation grazing system. Rapid improvements would occur in sagebrush, tarweed, and aspen treatment areas.	Soil productivity will improve throughout the uplands of the allotment because of the reduced soil compaction and vegetation loss that occurs from livestock grazing. The rate of soil improvement will be slow because soil development occurs slowly.	Effects on upland soil productivity would be similar to Alternative A except a slight increase in vegetative residue may occur from the deferred rotation grazing, compared to the current season-long grazing system. Like Alternative B, rapid improvements would occur in sagebrush, tarweed, and aspen treatment areas.

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #7 – Wildlife **a. Effect on threatened and endangered wildlife species and their habitat**	For lynx, essentially no change to the current condition. No effect for other threatened or endangered species.	For lynx, positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.	For lynx, greatest positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.	For lynx, slight positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.
b. Effect on sensitive wildlife species and their habitat	For goshawk, flammulated owl, and wolverine, essentially no change to the current condition. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, positive effect on prey species abundance and diversity. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, greatest positive affect on prey species abundance and diversity. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, slight positive effect on prey species abundance and diversity. No effect or little effect for other sensitive species.
c. Effect on Neo-tropical migratory birds	This alternative would provide habitat conditions for those species that prefer habitat with less understory cover.	This alternative would provide habitat conditions for a range of species, those that prefer habitat with higher amounts of cover and those that prefer less.	This alternative would provide habitat conditions for those species that prefer habitat with high amounts of understory cover.	This alternative would provide habitat conditions for a range of species, but tend toward those species that prefer habitat with less understory cover.

The Preferred Alternative

There is no preferred alternative identified at this time. The decision (to be documented in a forth-coming Record of Decision) will likely be a combination of actions considered in the FEIS.

Table of Contents

List of Tables Page

List of Tables Page

List of Figures Page

List of Figures Page

Chapter 1
The Purpose and Need

1.1 Introduction

This chapter outlines the environmental review process, introduces the proposed action and the purpose and need it addresses, specifies the decisions to be made regarding the proposal, describes the scoping process and issues, and lists permits which may be required to implement the proposal.

Subsequent chapters in the document describe the alternatives (Chapter 2), provide information on the current condition of potentially affected resources (Chapter 3), identify environmental consequences of the alternatives (Chapter 4), list the preparers of this environmental impact statement (EIS) (Chapter 5), and document consultation and coordination with other organizations (Chapter 6).

Because the proposed action has the potential to significantly affect the human environment, the National Environmental Policy Act of 1969, as amended (NEPA), requires that an EIS be prepared to assess and disclose the environmental affects of the proposal and alternatives to it.

Function of the EIS

The primary purpose of an EIS is disclosure of the environmental effects of implementing a proposed action or any of the alternatives. The EIS is not a decision document. The Forest Service decision associated with this analysis will be documented in a separate Record of Decision (ROD) signed by the Logan District Ranger. Decisions to be made in consideration of this environmental analysis are described later in this chapter. In particular, the EIS is intended to:

- Document the development and evaluation of the proposed action and alternatives as the basis for a Forest Service decision.
- Provide the site-specific environmental analysis of the activities encompassed by the range of alternatives.
- Describe, analyze, and disclose the biological, physical, and socioeconomic impacts associated with implementing each of the alternatives.
- Identify the long-term, direct, and indirect effects of the alternatives (40 CFR 1508.8).
- Disclose the effects of past, present, and reasonably foreseeable future actions that interact in a cumulative fashion with the direct and indirect impacts (40 CFR 1508.7).
- Indicate possible mitigating measures that may be used to avoid, minimize, eliminate, or reduce adverse impacts (40 CFR 1508.20).
- Provide a comprehensible, reliable, and informative document for interested public agencies, groups, and individuals.

1.2 Proposed Action

The Logan District of the Wasatch-Cache National Forest (WCNF) proposes to authorize grazing on the North Rich Allotment at a level and in a manner consistent with direction set forth in the Revised Forest Plan, the Rangeland Health EIS, and other applicable laws and regulations.

The proposal includes vegetation treatments and structural improvements designed to improve unacceptable resource conditions on the allotment and move vegetation and watershed conditions within the North Rich Allotment toward desired conditions.

The North Rich Allotment is located in the Wasatch Mountains in northern Utah, approximately 35 miles east of Logan, Utah (Figure 1.1). The allotment covers about 27,000 acres in the eastern portion of the Logan Ranger District (25,173 acres National Forest system land and 2,025 acres State lands). These figures differ slightly from what were shown in the January 1999 Scoping Letter (see Scoping Letter, Appendix A). In a land exchange in the year 2000, 1,920 acres previously in private ownership within the allotment boundary became National Forest system land in exchange for private land elsewhere on the Forest (The Land Exchange Map is available in the Project File).

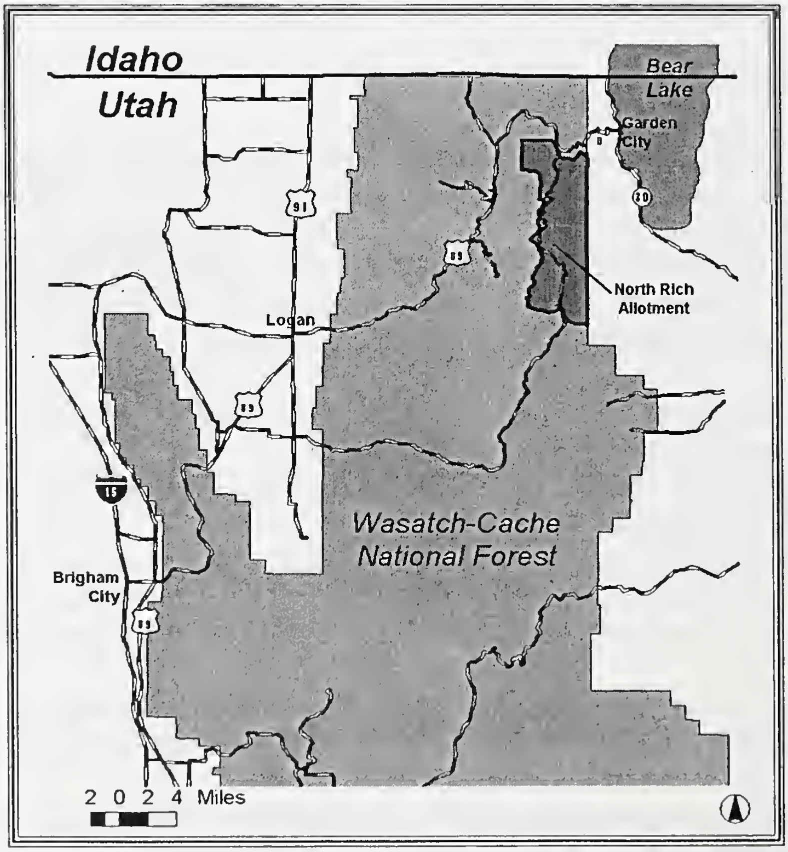


Figure 1.1 Map of the vicinity of the North Rich Allotment.

1.3 Purpose and Need

This section identifies the specific rationale behind the proposed action and the sources of guidance for its development. The specific rationale for the proposed action identifies the purpose and need for action. The sources of guidance form the context within which the proposal was developed.

1.3.1 Rationale for the Proposed Project

According to historic records for the allotment (available in the Project File), unacceptable resource impacts have occurred during the more than 100-year history of domestic grazing within the North Rich allotment. Although there has been some improvement, existing resource conditions in many areas are still unsatisfactory and not moving toward desired conditions.

In 1990, an integrated resource analysis was conducted (USDA Forest Service 1990) that covered the eastern portion of the Logan District, including land contained within the North Rich Allotment. This study concluded that "Analysis of the range condition in the study area shows that 35% of the rangeland is in poor to very poor condition. Riparian areas, in particular, are in poor condition" (USDA Forest Service 1990). Recommendations to improve the conditions included reducing the number of cattle allowed to graze, fencing riparian areas, strict utilization standards, and vegetation treatments in aspen and sagebrush communities. Since that time, the Rangeland Health EIS and ROD (USDA Forest Service 1996) imposed stricter utilization standards. However, range and riparian conditions in many areas remain poor.

In response to these concerns, the Forest Service proposed action is intended to accomplish the following **purpose:**

1. Improve conditions for range, riparian, wildlife, and watershed resources on the allotment and move them closer to desired conditions. Improvement will be gradual because of the complexity of factors involved, including, but not limited to, existing vegetation and soil conditions, on-going drought, historic fire exclusion, and historic grazing levels.

2. Comply with Public Law 104-19, Section 504 (a): schedule and complete NEPA analyses on all allotments where needed to authorize permitted grazing activity.

The **need** for the proposed action is generated by the difference between current and desired resource conditions on the allotment. The **desired conditions** for the North Rich allotment are described in Section 1.5. The **current conditions** are summarized below and described in detail in Chapter 3, Affected Environment. Monitoring of the North Rich Allotment (discussed in Chapter 3 and available in the project file) indicates problems in meeting Forest Plan direction at several specific sites, illustrated as follows:

- **Uplands:** The combination of high levels of historic grazing and the exclusion of fire for nearly 100 years has resulted in many acres of suitable rangelands not meeting or moving toward desired conditions. These areas are deficient in ground cover, desirable species composition, and plant community structure. For example, ground cover in sagebrush communities measured at several areas, including Middle and South Sinks and Peter Sinks, do not meet Forest Plan standards (Forest Plan S7, "minimum 85% of potential ground cover for each vegetation cover type"). Field inventories show that most of the aspen community types identified throughout the allotment belong to community types described by Mueggler (1988) as "grazing induced" types, and lack a desirable variety of structural and species characteristics (field notes available in the project file).

- **Riparian:** Several natural, unprotected water sources have been utilized to the degree that unacceptable levels of compaction, soil erosion, and sedimentation have occurred. Monitoring data from Tin Cup Spring, Government Spring, Clay Seep, and North Cheney Spring indicate that these areas are not meeting Forest Plan desired conditions, goals, and objectives (field notes available in the project file). Except where fenced from livestock grazing, heavy use in nearly all riparian areas on the allotment (including streams, springs and wet meadows) has resulted in decreased plant vigor, decreased structural and species diversity, and high amounts of compaction, with a resulting loss of site productivity and quality habitat for wildlife, especially wetland-dependant species. The lower portion of Hells Hollow has been fenced and has experienced continued improvement in riparian condition (species composition and streambank stability). The upper, unfenced portion of Hells Hollow, Mill Hollow, upper portions of Cheney Creek, and portions of Bear Wallow with perennial moisture, are all identified as being in early seral condition. Hodges Canyon and Richardson Fork also do not meet desired watershed conditions.

These areas of concern are described in more detail in Chapter 3, Affected Environment.

1.3.2 Forest Service Guidance

Guidance for the management and administration of the North Rich Allotment is provided from many sources, including the Forest Service Manual (FSM), Forest Service Handbooks (FSH), the Revised Forest Plan (USDA Forest Service 2003) and the Rangeland Health EIS (USDA Forest Service 1996). The following summarizes the guidance provided from these sources.

1.3.2.1 Forest Service Manual

The Forest Service Manual (FSM), which outlines policy for administration of National Forest System lands, addresses rangeland management and administration. The policy includes objectives of the range management program for the National Forests and

Grasslands (FSM 2202.1). The objectives, used to help formulate the proposed action, are as follows:

- To manage range vegetation to protect basic soil and water resources, provide for ecological diversity, improve or maintain environmental quality, and meet public needs for interrelated resource uses.

- To integrate management of range vegetation with other resource programs to achieve multiple use objectives contained in Forest land and resource management plans.

- To provide for livestock forage, wildlife food and habitat, outdoor recreation, and other resource values dependant on range vegetation.

- To contribute to the economic and social well being of people by providing opportunities for economic diversity and promoting stability for communities that depend on range resources for their livelihood.

Additional management direction for rangeland resources can be found in FSM 2200, Range Management, WO Amendment 2200-90-1, Chapters 10-50.

1.3.2.2 Forest Service Handbooks

Forest Service Handbooks (FSH) also provide guidance for the management and administration of rangelands. Although an area may be capable and suitable for use by domestic livestock, authorization to graze specific areas is needed through a project level National Environmental Policy Act (NEPA) decision. The basic direction for addressing these project level decisions is contained in FSH 1909.15 (Environmental Policy and Procedures) and FSH 2209.13 (Chapter 90 – Rangeland Management Decision Making). An environmental analysis and subsequent NEPA decision is needed to authorize grazing on the North Rich Allotment because there has been no NEPA analysis associated with this allotment.

The Allotment Management Plan (AMP) implements the applicable management direction from the NEPA decision to authorize grazing (if so made), and becomes a term and condition of the grazing permit (FSH 2209.13). The North Rich AMP (revised and signed in June 1994) will need to be revised again to reflect management direction from the NEPA decision resulting from this analysis.

The AMP would be revised in accordance with 36 CFR 222.1 and 222.2, which describe allotment management planning provisions and management of the range environment. It would include goals and objectives, grazing management requirements (such as a description of the number, kind, class, and type of livestock to be grazed, the timing and duration of use, and the grazing system including frequency and duration of rest periods from grazing), a schedule of improvements, including the priority, responsibility, and

planned completion dates, and specific monitoring standards to be applied to determine if desired objectives are being achieved (as described in this environmental analysis).

Additional management direction for rangeland resources can be found in Intermountain Interim Directive FSH 2209.3-99-9, Grazing Permit Administration Handbook, Chapter 90, Rangeland Management Decision Making; and FSH 2209.21 Rangeland Ecosystem Analysis and Management Handbook, R4 Amendment 2209.21-93-1, Chapters 10-40.

1.3.2.3 Forest Plan

Forest Plans establish guidance for project level decisions. The WCNF has recently revised the 1985 Forest Plan. The Final EIS, Record of Decision, and Revised Forest Plan were released in April 2003. The North Rich Interdisciplinary (ID) Team has incorporated management direction, standards, and guidelines from the Revised Forest Plan into the proposed action and alternatives for the North Rich Allotment. The Revised Forest Plan provides the following forestwide goals and subgoals that guided the development of the proposed action and alternatives (Revised Forest Plan, pages 4-17 to 4-24). A copy of the Revised Forest Plan is available in the Project File.

Forestwide Goal 2 - Watershed Health

Maintain and/or restore overall watershed health (proper functioning of physical, biological and chemical conditions). Provide for long-term soil productivity. Watershed health should be addressed across administrative and political boundaries.

Forestwide Subgoals – Watershed Health

2a. Identify areas not in properly functioning condition. Improve plant species composition, ground cover and age class diversity in these areas.

2b. Maintain and/or improve water quality to provide stable and productive riparian and aquatic ecosystems.

2d. Protect waters meeting or surpassing State water quality standards by planning and designing land management activities to protect water quality.

2e. Maintain and/or restore stream channel integrity, channel processes, and sediment regimes (timing, volume, character of sediment input/transport) under which riparian & aquatic ecosystems developed.

2f. Maintain water in streams, lakes, and wetlands of adequate quantity and quality to provide for instream flows and existing downstream uses including support of healthy riparian & aquatic

habitats, stability & effective function of stream channels, ability to route flood discharges, and to maintain recreation opportunities.

2g. Maintain and/or restore natural timing and variability of water table elevation in spring sources, meadows & wetlands.

2h. Maintain and/or restore diversity, productivity, vigor, and regenerative capacity of native and desired non-native riparian and wetland plant communities to provide an amount and distribution of large woody debris characteristic of natural aquatic & riparian ecosystems. Provide adequate summer & winter thermal regulation; and to help achieve rates of surface erosion and channel migration characteristic of those under which desired communities develop.

2i. Maintain and/or restore soil productivity to improve watershed functioning through managing groundcover, soil compaction, and vegetation.

2j. Maintain and/or restore habitat to sustain populations of well-distributed native and desired non-native plant, vertebrate, and invertebrate populations that contribute to viability of riparian-dependent communities.

Forestwide Goal 3 - Biodiversity & Viability

Provide for sustained diversity of species at the genetic, populations, community and ecosystem levels. Maintaining communities within their historic range of variation that sustains habitats for viable populations of species, restores or maintains hydrologic functions, and reduces potential for uncharacteristic high-intensity wildfires, and insect epidemics.

To achieve sustainable ecosystems, meet properly functioning condition (PFC) criteria for all vegetation types that occur in the Wasatch-Cache National Forest. Focus on approximating natural disturbances and processes by restoring composition, age class diversity, patch sizes, and patterns for all vegetation types. Guideline G-11 contains the desired landscape scale structure and pattern for vegetation cover types.

Forestwide Subgoals – Biodiversity and Viability

3a. Maintain or restore viability of populations of species at risk, Watch List Plants, and rare communities.

3b. Maintain pollinators and minimize impacts to pollinators or their habitats.

3f. Maintain or restore species composition, such that the species that occupy any given site are predominantly native species in the kind and amount that were historically distributed across the landscapes.

3g. Maintain and/or restore tall forb communities to mid seral or potential natural community (PNC) status.

3i. Maintain viability of species-at-risk (including endangered, threatened and sensitive species and unique communities).

3j. Manage Forest Service sensitive species to prevent them from being classified as threatened or endangered and where possible provide for delisting as sensitive (FSM 2670).

3l. Provide suitable habitat for prey species such as hares, squirrels, and small mammals.

3n. Maintain or restore aquatic and riparian habitats, through recognition and management of Riparian Habitat Conservation Areas for metapopulations of cutthroat trout, recognizing the relative degree to which these fish depend on National Forest lands and conditions of these habitats off-forest.

3o. Provide adequate habitat components for sustainable big game populations coordinated with State wildlife management agencies, private lands and other resource needs and priorities.

Forestwide Subgoal – Noxious Weed Control

3s. Greatly reduce known infestations of noxious weeds and rigorously prevent their introduction and/or spread.

Forestwide Goal 10 – Social/Economic Contributions

Contribute to the social and economic well being of local communities by promoting sustainable use of renewable natural resources and by participating in efforts to devise creative solutions for economic health (diversity and resiliency). Provide timber for commercial harvest, forage for livestock grazing, exploration and development opportunities for mineral resources, and settings for recreation consistent with goals for watershed health, sustainable ecosystems, biodiversity and viability, and scenic/recreation opportunities.

Forestwide Subgoal - Forage for livestock grazing

10c. Manage livestock grazing levels and operations on suitable lands for sustaining forage use within properly functioning conditions.

The WCNF Revised Forest Plan also provides the following forestwide objectives relevant to the development of the proposed action and alternatives (Revised Forest Plan, pages 4-29,30 and 4-31,32). A copy of the Revised Forest Plan is available in the Project File.

Forestwide Objectives for Vegetation Management

Purpose: To achieve forest and rangeland vegetation composition, structure, and patterns in properly functioning condition (i.e., within their historic ranges of variation). To move toward a variety of vegetation types, age classes, and patch sizes covering the landscape and contributing to healthy watersheds, aquatic and terrestrial wildlife habitats, recreation environments, and production of commodities such as wood and forage.

Objectives to accomplish desired conditions:

a. Stimulate aspen regeneration and reduce other encroaching woody species in aspen by treating (fire use and/or timber harvest) approximately 3,200 acres average annually for a 10-year total of 32,000 acres.

b. Increase grass and forb production and plant species and age class diversity in sagebrush and pinyon/juniper by treating approximately 2,000 acres average annually for a 10-year total of 20,000 acres.

Forestwide Objectives for Rangeland Management

Purpose: To manage rangeland ecosystems so they support vegetation with adequate ground cover to protect watersheds and plant communities with desired species composition, structure, and function dominated by desired perennial grasses and forbs, with a range of shrub cover. To manage riparian areas for proper functioning with deep-rooted vegetation or rocks armoring stream banks and allowing sediment filtration and erosion prevention. To protect spring sources, associated wetlands and other critical areas from excessive use and to restore these to proper functioning condition. To manage for rest and deferred rotation grazing systems, riparian pastures and/or necessary structural improvements that are in place and maintained. To ensure that grazing permit holders move livestock as needed to comply with riparian stubble height requirements, upland utilization standards, and to achieve ground cover standards. To encourage permit holders to share responsibility with the Forest Service for

monitoring use, and to take full responsibility for movement and control of their livestock.

Objectives to accomplish desired conditions:

5.a. Fully implement the Rangeland Health Amendment Forestwide by finalizing riparian classification and notifying permit holders of utilization standards based on this classification within 1 year.

5.b. Validating key areas and focusing monitoring of utilization standards in allotments containing riparian dependent TES within 3 years.

5.c. Developing ground cover potentials for missing vegetation cover types within 2 years.

5.d. Assess/validate existing conditions and continue establishing long-term trend monitoring for 10% of allotments annually.

5.e. Establish clear expectations with all permit holders to achieve stated purposes within 1 year.

5.f. Assess and prioritize noxious weed infestations for appropriate treatment within 1 year.

The WCNF Revised Forest Plan also provides the following management prescriptions relevant to the development of the proposed action and alternatives (Revised Forest Plan, pages 4-58 through 4-75).

Management Prescriptions

Management Prescriptions, as defined in the Revised Forest Plan, are "management practices and intensity selected and scheduled for application on a specific area to attain multiple use and other goals and objectives." Management Prescription Categories provide a general sense of the management or treatment of the land intended to result in a particular condition being achieved or set of values being restored or maintained (See Revised Forest Plan, page 4-58). These Categories are not intended to stand alone. They are just one part of the total management direction that includes goals, objectives, desired future conditions, standards and guidelines, and monitoring requirements. The entire management direction package for an area must be considered, not just the prescription. Where an activity is allowed within a prescription, it must be done so within the parameters established by all the above (USDA Forest Service 2003).

The area within the North Rich Allotment includes several Management Prescription Categories (MPCs) as shown in Table 1.1 and Figure 1.2. A majority of the allotment is MPC 5.1, 3.2u, 3.2d, and 3.1a. Each of these categories has an emphasis of protecting, and/or maintaining or restoring forested ecosystems or aquatic/watershed or terrestrial integrity. Approximately 10 percent is in MPCs with emphasis on backcountry or dispersed motorized recreation, while the remaining is either State or private lands or in Special Management Areas.

Table 1.1 Management Prescription Categories (MPC) for the North Rich Allotment

MPC	Prescription	Acres	Percent
5.1	Emphasis on Maintaining or Restoring Forested Ecosystem Integrity While Meeting Multiple Resource Objectives.	9,263	33.7%
3.2u	Protection, Maintenance, or Restoration of Aquatic / Watershed or Terrestrial Integrity - Terrestrial Habitat Emphasis, Undeveloped	6,724	24.5%
3.2d	Protection, Maintenance, or Restoration of Aquatic / Watershed or Terrestrial Integrity - Terrestrial Habitat Emphasis, Development Allowed	5,157	18.8%
3.1a	Protection, Maintenance, or Restoration of Aquatic/Watershed or Terrestrial Integrity - Aquatic Habitat Emphasis	65	0.2%
4.3	Emphasis on Backcountry Motorized Recreation Settings	1,370	5.0%
4.4	Emphasis on Dispersed Motorized Recreation Settings	812	3.0%
2.7	Special Management Area - Special Area	1,240	4.5%
2.5	Special Management Area - Scenic Byway	59	0.2%
Utah	State of Utah Lands	2,717	9.9%
Pvt	Private Lands	82	0.3%
	Total	27,489	100.0%

Management prescriptions in the 2.0 categories include Special Management Areas where emphasis is on maintaining, enhancing, or restoring those values for which the area was established. Although the theme for this category is Special Management Areas, multiple-use means the harmonious and coordinated management of a variety of resources, without impairment of the productivity of the land. As long as other allowed resource activities, such as livestock grazing, fire use or road construction meet the direction in the standards and guidelines, then they are consistent with the special management area prescription category (Revised Forest Plan, page 4-65). The T.W. Daniel Experimental Forest, a 2.7 Special Interest Area, is within the North Rich Allotment.

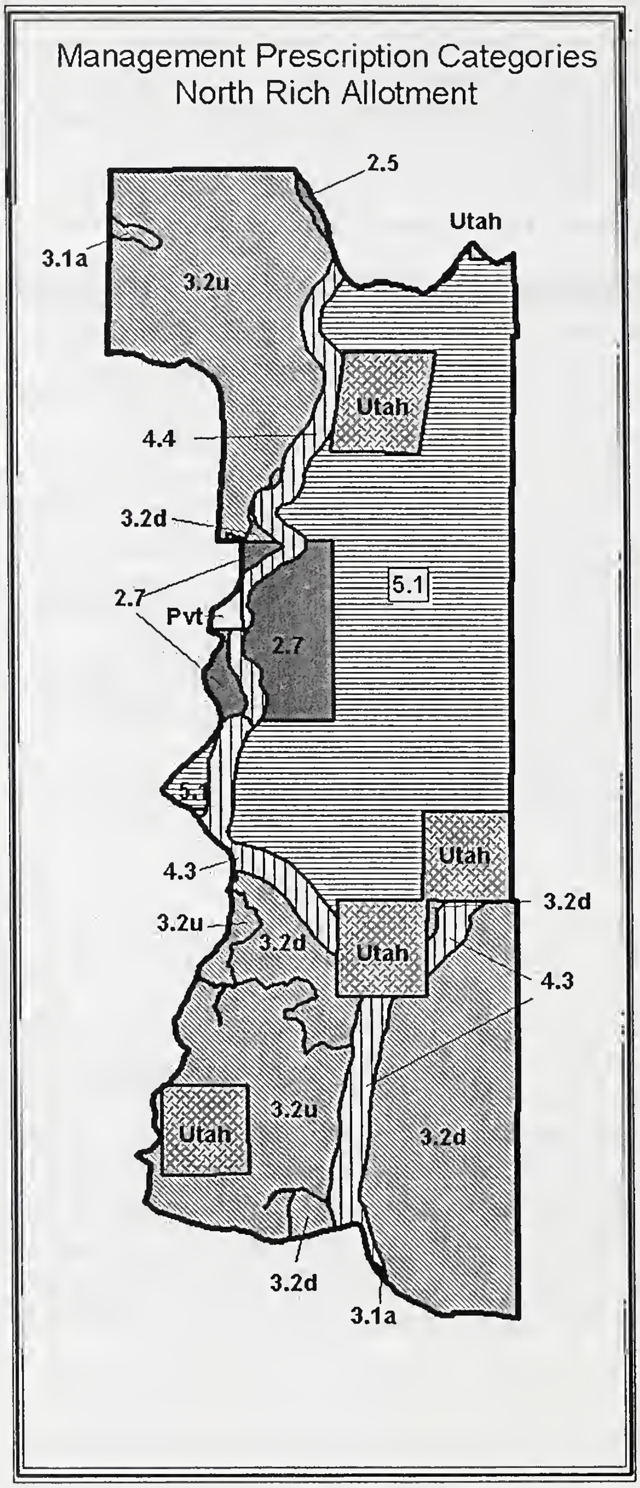


Figure 1.2 Distribution of Management Prescription Categories in the North Rich Allotment.

Management prescriptions in the 3.0 categories include lands where management emphasis is on maintaining or restoring aquatic/watershed and terrestrial habitat integrity. The difference between 3.2d and 3.2u is, one category (3.2d) allows road construction, timber harvest, and new recreation development, and the other (3.2u) does not. Riparian areas in MPC 3.1a have only Class I riparian areas, which are to be grazed to the highest standard. As long as other allowed resource activities, such as livestock grazing, fire use or road construction meet the direction in the standards and guidelines, then they are consistent with the habitat integrity prescription category (Revised Forest Plan, page 4-68).

Management prescriptions in the 4.0 categories include lands managed with special consideration for General Forest Areas and Developed Recreation Areas, where recreation needs and opportunities are emphasized. As long as other allowed resource activities, such as livestock grazing, fire use or road construction meet the direction in the standards and guidelines, then they are consistent with the recreation prescription category (Revised Forest Plan, page 4-71). The Sinks Road, included in the 4.4 category for Dispersed Motorized Emphasis, is within the North Rich Allotment.

Management prescriptions in the 5.0 categories include lands that are predominantly forested, where emphasis is on maintaining and restoring forest ecosystem functioning to achieve sustainable resource conditions, while providing favorable conditions for commodity and non-commodity outputs and services. As long as other allowed resource activities, such as recreation, livestock grazing, aquatic habitat restoration or road construction meet the direction in the standards and guidelines, then they are consistent with the forestland prescription category (Revised Forest Plan, page 4-74).

Management Areas

The North Rich Allotment falls within the Bear Management Area and the Cache Box Elder Management Area. The direction with regard to livestock grazing for these Management Areas as relevant to the North Rich Allotment is as follows (from Revised Forest Plan, page 4-126 and 4-138).

> Rangeland/Livestock Grazing Desired Future Conditions:
>
> Livestock grazing is a permitted use within active allotments. Grazing levels will be adjusted and managed with up-to-date Allotment Management Plans (AMPs). AMPs prescribing rest and deferred rotation grazing systems and riparian pastures are in place. These systems will help to improve and maintain plant vigor and composition, aquatic health and terrestrial habitat. Conflicts with other uses will be minimized consistent with the management direction package for each area. Riparian and upland vegetation will be at or moving toward desired composition that meets multiple resource goals described under watershed and biodiversity/viability desired future conditions. Management tools, including such things as fire use, mechanical treatments, herbicide treatments, and short

duration/high intensity grazing, will be employed to improve range health and conditions. Springs and seeps will be protected from compaction. Structural improvements such as fences and water developments will be constructed or reconstructed and maintained, to improve animal distribution and control. Structural improvements that are not needed will be removed from the forest.

Grazing permit holders will move livestock as needed to ensure riparian stubble height requirements, upland utilization standards, and ground cover standards are met. Permit holders will share responsibility with the Forest Service for monitoring use, and will hold full responsibility for movement and control of livestock. Excess and unauthorized livestock use will be minimal. The number of term grazing permits will be reduced by the formation of grazing associations and the issuance of association permits instead of individual ones. The importance of permitted grazing on the national forest to local agricultural communities, maintenance of open space, and the western ranching lifestyle will be recognized.

1.3.2.4 Rangeland Health EIS

The WCNF Rangeland Health EIS (RHEIS) (USDA Forest Service 1996) provides further direction for the management of rangelands within the North Rich allotment. The intent of the RHEIS was to provide specific direction for livestock management necessary to sustain healthy rangeland ecosystems. It amended the 1985 WCNF Forest Plan to include a forest-wide desired future condition for four rangeland ecosystem types, utilization and ground cover standards, and monitoring plans for rangelands on the WCNF. The RHEIS was incorporated into the Revised Forest Plan, with the addition of a new guideline (Forest Plan Guideline 71) of 30 to 40 % utilization on rangelands in unsatisfactory condition.

The RHEIS describes the relationship between the Forest Plan, allotment plans and grazing permits (RHEIS, pages 1-7). It explains that grazing may occur on the National Forests in accordance with terms and conditions established by the Forest Service: "The Secretary…in regulating grazing…is authorized, upon such terms and conditions as he may deem proper, to issue permits for grazing livestock…*provided*, that nothing herein shall be construed as limiting or restricting any right, title, or interest of the United States in any land or resources" (Granger-Thye Act 1950).

Specific guidance from the RHEIS pertinent to this analysis includes the following:

- Description of desired future conditions for three of four rangeland types, including riparian areas, uplands, and aspen. (The alpine type is not applicable to the North Rich Allotment.)
- Utilization standards (maximum allowable use levels expressed in percent of the total annual production (dry weight) for herbaceous species and percent of total annual growth (length) for woody species. Utilization is measured for key species

and determined by averaging the use of key species in key areas based on the measurement of about 50 to 100 individual plants.

- Determination of Riparian Values Class for all riparian areas within the allotment.
- Establishment of a minimum effective ground cover percent at 85% of the potential for each cover type.
- A description of annual and long term trend monitoring and evaluation to be used to monitor annual forage and browse utilization and long-term trend in rangeland conditions associated with livestock grazing.

1.3.2.5 Incorporation by Reference

Some material in this document tiers to or incorporates by reference related information in order to reduce the size and degree of redundancy in this document. Material incorporated by reference includes the following:

- Material specifically cited or otherwise used in preparation of this document is hereby incorporated by reference.
- Information in this document tiers to the direction in the WCNF Revised Forest Plan and its Record of Decision (April 2003). Information in the Revised Forest Plan FEIS is hereby incorporated by reference.
- The entirety of the supporting project record is hereby incorporated without further reference.
- The project record is available for review at the Logan Ranger District Office, 1500 East Highway 89; Logan, UT 84321.

1.4 Decisions to be Made

In consideration of this analysis, the Forest Service will decide whether or not to authorize grazing on the North Rich Allotment. The decision could involve the proposed action or any of the other alternatives in their entirety, or could include specific portions of the proposed action or any alternative. If the decision is made to authorize grazing, the decision may include the grazing system, season of use, utilization standards and guidelines, ground cover standards, associated improvements, mitigation measures, and monitoring to be included in the revised AMP.

The decision will be made by the Logan District Ranger and will be documented in a Record of Decision, subject to public review and appeal.

1.5 Desired Conditions

The project interdisciplinary team (ID Team) developed desired conditions for the allotment using numerous sources, including public comments to North Rich scoping and the Forest Plan revision process (comments are available in the Project File). The team also used the following: the Revised Forest Plan, the RHEIS, the Sub-Regional Assessment of Properly Functioning Conditions Encompassing the National Forests of Northern Utah (USDA Forest Service 1998), Aspen Community Types of Utah

(Mueggler and Campbell 1986), Rangeland Cover Types of the United States (Shiflet 1994), and the Riparian Community Type Classification of Utah and Southeastern Idaho (Padgett et al. 1989).

1.5.1 Aquatic Species

Fish Habitat

Aquatic habitats will be managed to maintain cool, clear water and well-vegetated stream banks for cover and bank stability. Cool water temperatures will be preserved through well-vegetated banks. Instream flows and cover, in the form of deep pools and structures such as boulders and logs, will be maintained and their value recognized. Natural reproduction of fish will be aided through minimizing sediment input from roads and trails.

Amphibians and Invertebrates Habitat

Marshy edges of ponds, lakes, and springs will be protected to allow for the development of in-water and riparian vegetation. Soil around water bodies will not be compacted and will allow for burrowing and over wintering of amphibians.

Aquatic Threatened, Endangered, and Sensitive Species Protection/Recovery

Management priority will be given to the Bonneville cutthroat trout meta-populations in the Logan River and upper Blacksmith Fork. Isolated populations, such as in upper Saddle Creek, will be protected and their habitats enhanced. Removal of non-native fish in upper Saddle Creek would be considered. Springs will be protected and their value recognized. Additional water developments will be permitted to reduce or eliminate impacts of grazing. These developments will provide for existing amphibian habitat. The values of instream flows for aquatic and semi-aquatic species will be recognized and protected.

1.5.2 Heritage Resources

Inventory efforts will continue in this management area to identify and document sites representative of early American Indian habitation and use and early European pioneer settlement in the 1800s in Rich County. The importance of springs and the presence of early American Indian use is recognized and valued. Additional water developments and maintenance for improved management of livestock grazing are designed to not adversely affect significant cultural resources in the area.

1.5.3 Recreation, Roads and Trails

A variety of recreation opportunities and settings will be provided. Management for recreation will be emphasized along popular travel routes and will assure use is within acceptable limits for watershed health and resource protection. Newly constructed

facilities will emphasize day use. Dispersed recreation activities and settings will meet a variety of user preferences and will be emphasized along existing travel corridors. Opportunities for motorized loop systems for ATV's will be evaluated. Recreationists will keep vehicles and camping impacts within marked areas and outside of sensitive areas to insure watershed and other resource protection. Recreation impacts will be monitored, users will be informed and assist with needed changes in management. Hardening of sites and use of barriers in and near riparian areas will be employed to reduce or prevent unacceptable impacts.

Roads and trails will be designed and maintained to protect watersheds while providing a variety of recreation and access opportunities. Seasonal road closures will be used to protect road surfaces when wet, to minimize impacts to wildlife and/or to provide non-motorized hunting experiences. Roads and trails will be clearly marked to inform visitors of allowed uses and to help users stay on designated open routes. Roads and travel ways not needed as part of the road system will be closed and restored to productive vegetation and protection of watersheds. Enforcement of the travel plan will be a priority to protect resources and inform users. In the winter, parking for both motorized and non-motorized winter dispersed recreation will be provided.

1.5.4 Riparian

Based on the Rangeland Health Record of Decision (USDA Forest Service 1996), the desired condition for Riparian Class 1 and Riparian Class 2 areas is to be in the "late seral" to "potential natural community" stage. This means that 85 to 100% of the plant communities in any given riparian complex must be recognized as potential types. All riparian areas within the North Rich allotment have been classified as Riparian Class 1 or Class 2, and should be managed as late seral or potential natural community status. Class 1 riparian areas in the North Rich Allotment are so classified because of the presence of either Bonneville cutthroat trout or boreal toads. Habitat for boreal toad will be emphasized.

1.5.5 Socioeconomics

The Forest Service is aware of the dominant role that agricultural enterprise and outdoor recreation have in the adjacent rural area. Agency participation will continue with local communities such as Randolph to plan and implement economic development projects.

1.5.6 Vegetation

As part of the Record of Decision for the Rangeland Health EIS, a desired future condition for four rangeland vegetation types was established. The desired condition was described in broad terms to apply forestwide. During project level analysis, such as the analysis contained in this EIS, desired species for vegetation types in a particular landscape are described further to refine the desired outcome. The RHEIS also

established a minimum effective ground cover percent at 85% of the potential as a standard for each cover type. The Revised Forest Plan (USDA Forest Service 2003) adopted this and other standards outlined in the RHEIS. Below are the desired conditions for vegetation types found within the North Rich Allotment.

Aspen - The aspen cover type includes some climax aspen communities (communities where aspen remains the dominant over time), but most are seral aspen communities (i.e., communities where conifers, such as subalpine fir, lodgepole pine, and/or Douglas-fir, eventually replace aspen) with a small to large component of conifers either in the overstory or as components in the understory. These conifers have and will continue to replace aspen as they mature and as disturbances, such as fire and/or harvest, continue to be controlled or otherwise limited.

Potential ground cover in all aspen communities approaches 100%. Thus, in applying the Revised Forest Plan ground cover standard, a minimum ground cover of 85% is desired for all aspen stands.

- Seral Aspen – The desired condition for this type includes a wide variety of age classes as noted in the Properly Functioning Condition document (USDA Forest Service 1998) with only about 20% of aspen communities classified as conifer-aspen and/or aspen-conifer cover types. The understory would have at least 10% cover of tall forb species (listed in Table 1.2) to place stands into one of the tall forb aspen community types (c.t.) including:
    - Aspen/Tall Forb c.t.
    - Aspen/Snowberry/Tall Forb c.t.
    - Aspen/Serviceberry-Snowberry/Tall Forb c.t.
    - Aspen/Serviceberry/Tall Forb c.t.
    - Aspen-Subalpine Fir/Snowberry/Tall Forb c.t.
    - Aspen-Subalpine Fir/Tall Forb c.t.

Table 1.2 Species included in the tall forb understory component of the aspen community type classification (Mueggler 1988).

Common Name	Scientific Name
Horse-nettle	*Agastache urticifolia*
Engelmann aster	*Aster engelmannii*
Western larkspur	*Delphinium occidentale*
Showy stickseed	*Hackelia floribunda*
Cow parsnip	*Heracleum lanatum*
Bluebells	*Mertensia arizonica* and/or *M. ciliata*
Western sweet-cicely	*Osmorhiza ocidentalis*
Groundsel	*Senecio serra* and/or *S. triangularis*
Western valerian	*Valeriana occidentalis*

- Climax Aspen - The desired condition for this type includes a wide variety of age classes as noted in the Properly Functioning Condition document (USDA Forest Service 1998). This type is not replaced by conifer. As with the Seral Aspen communities described above, the understory would have at least 10% cover of tall forb species to place stands into one of the aspen community types including, but not limited to, those noted below:

    - o Aspen/Tall Forb c.t.
    - o Aspen/Snowberry/Tall Forb c.t.
    - o Aspen/Serviceberry-Snowberry/Tall Forb c.t.
    - o Aspen/Serviceberry/Tall Forb c.t.

Conifer (Rangeland Conifer and Non-Range Conifer) - The desired condition for the spruce-fir (*Picea engelmannii – Abies lasiocarpa*) component of the conifer cover types would be a mixture of age classes, from young to old, with mature and old age classes dominating to continue to support the large north-south wildlife corridor. The desired condition for the lodgepole pine (*Pinus contorta*) component of the conifer types would be a mixture of age classes as noted in the Properly Functioning Condition document (USDA Forest Service 1998) and in stand sizes that approximate historic, natural processes.

Sagebrush/Grasslands - This type includes spiked big sagebrush (*Artemisia tridentata* ssp. *spicata*), mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*) and low sagebrush (*Artemisia arbuscula*). Of these, the mountain big sagebrush is the most common in the area. In the northern portion of the allotment low sagebrush is common on rocky slopes adjacent to mountain big sagebrush. Spiked sagebrush is the least common, found only in areas with deeper, moister soils at higher elevations.

- Mountain Big Sagebrush - Desired conditions for this type includes a wide variety of sagebrush canopy closures with a maximum of approximately 30-35%. Canopy closures greater than this can only be accomplished through excessive grazing pressures. According to Winward (pers. comm. 2002), species composition would include bluebunch wheatgrass (*Elymus spicatus*) and/or slender wheatgrass (*Elymus trachycaulus*) as the dominant grasses. There would also be scattered communities with sheep (Idaho) fescue (*Festuca ovina*) as a component of the undergrowth. Forbs would include Lupine (*Lupinus* spp.), Beardtongue (*Penstemon* spp.), Glandular cinquefoil (*Potentilla glandulosa*), slender cinquefoil (*P. gracilis*), and/or sticky geranium (*Geranium viscossisimum*). Appendix B of the Rangeland Health EIS (USDA Forest Service 1996) identified a range of potential ground cover for the mountain big sagebrush cover type (81 to 96%). Potential ground cover for mountain big sagebrush communities was 86% on an ungrazed site adjacent to and north of the North Rich allotment. Because this site is similar

to those within the North Rich allotment, minimal allowable ground cover would, therefore, be 73% (86% x 0.85).

- Low Sagebrush – Desired condition for this type includes a scattered overstory of low sagebrush with bluebunch wheatgrass and/or slender wheatgrass as a component of the understory. Winward (pers. comm. 2002) noted that tufted bluegrass species, such as Sandberg's bluegrass (*Poa secunda*) and/or muttongrass (*Poa fendleriana*), are also desirable components of the low sagebrush communities in this area. He also noted that forbs in these communities should include locoweed (*Astragalus* spp.), paintbrush (*Castilleja* spp.), and/or sego lily (*Calochortus nuttalii*). Potential ground cover has been measured at 69%, primarily composed of exposed rock (Appendix B of the Rangeland Health EIS, USDA Forest Service 1996). Thus, the minimal allowable ground cover would be 59% (69% x 0.85).

- Spiked Big Sagebrush – Because the sites on which spiked big sagebrush occur are typically very productive, estimated potential ground cover is close to 100% (Winward 1999). Thus, the minimal allowable ground cover would be 85%. Additional studies need to be conducted in this type to better define potential ground cover, but even if potential ground cover were 90% (10% less than the highest ground cover), a minimum of 77% ground cover would be required on these sites. Communities dominated by spiked big sagebrush often have snowberry (*Symphoricarpos oreophilus*) as a component of the overstory with occasional and scattered elderberry (*Sambucus* spp.) plants. Winward (pers. comm. 2002) noted that the desired grass component of the understory is a mixture of mountain brome (*Bromus carinatus*), slender wheatgrass (*Elymus trachycaulus*), oniongrass (*Melica bulbosa*) and/or purple oniongrass (*Melica spectabilis*). The forb component is similar to those species that occur in the tall forb cover type, and often includes stickseed (*Hackelia* spp.), saw groundsel (*Senecio serra*), western coneflower (*Rudbeckia occidentalis*), Fendler's meadowrue (*Thalictrum fendleri*), arrowleaf balsamroot (*Balsamorhiza saggitata*), and yarrow (*Achillea millefolium*), among others.

Curlleaf Mountain Mahogany - Potential ground cover of this type ranges from 70 to 82% (Appendix B of the Rangeland Health EIS, USDA Forest Service 1996), and thus the desired condition of 85% of potential results in a range of ground covers from 60 to 70%. Curlleaf mahogany (*Cercocarpus ledifolius*) dominates the overstory, and bluebunch wheatgrass and/or slender wheatgrass are the dominant grasses.

Mountain Brush - This vegetation type is a minor component of the allotment, and has a desired ground cover of approximately 78% based on a potential ground cover measurement of 92% for the snowberry vegetation type in the Rangeland Health EIS. Species composition would include a variety of shrubs such as snowberry (*Symphoricarpos oreophilus*), serviceberry (*Amelanchier alnifolia*),

chokecherry (*Prunus virginiana*), and/or elderberry (*Sambucus* spp.). Understory species are highly variable and includes those listed for the spiked big sagebrush type described above.

Tall Forb - Desired condition for tall forb sites, especially those without altered potential through the loss of topsoil, includes a variety of species such as sticky geranium, bluebells (*Mertensia arizonica* and/or *M. ciliata*), jacobsladder (*Polemonium* spp.), western coneflower, Louisiana wormwood (*Artemisia ludoviciana*), saw groundsel, mountain brome, oniongrass, and purple oniongrass. Ground cover is often relatively low in this type because the dominance of forbs does not produce high amounts of litter from year to year. Ground cover from two reference tall forb sites (at their natural potential) on the Forest ranged from 49 to 75% (USDA Forest Service 1996). This results in a range of 42 to 64% desired ground cover when applying the 85% of potential standard.

Winward (pers. comm. 2002) noted that tall forb sites that have experienced a significant loss of topsoil and are currently dominated by tarweed (*Madia glomerata*), knotweed (*Polygonum* spp.), or other annuals should be allowed to go through plant successional stages to increase ground cover, soil, soil organic matter, and nutrients. Perennial plants such as Letterman's needlegrass (*Stipa lettermanii*) and native annuals such as softchess (*Bromus mollis*) would provide for the build-up of ground cover and soil organic matter, while lupine (*Lupinus* spp.) and other native nitrogen fixers would help build soil nutrients.

1.5.7 Watershed

Watersheds will be properly functioning with adequate ground cover to prevent soil erosion, and provide infiltration and moisture holding for storage and release of water to streams and aquifers. Spring sources and associated bogs and wetlands will be protected from excessive use and have been restored to proper functioning. Riparian areas will be properly functioning with adequate deep-rooted vegetation or armoring along banks to allow for sediment filtering and erosion prevention. Riparian areas will be protected from overuse and trampling from livestock grazing and recreation uses.

1.5.8 Wildlife

Forest plan direction specifies that "restoration and/or maintenance of a healthy and sustainable, broad scale, north-south wildlife corridor within this management area will be a priority in all management decisions. Vegetation will form a mosaic of habitat types, diverse in species composition and structure approximating historic patterns."

To restore and maintain forest health and habitat for a range of wildlife species within the project area, the following are part of the long-term goals for the allotment:

- Grazing altered vegetation types will be reduced and native vegetation conditions within the project area will be restored (especially understory

conditions in aspen stands and tall forb communities). Grass, forbs, and shrublands are at or moving toward properly functioning condition.

- A variety of forage conditions (ungrazed, lightly grazed, moderately grazed) exist within the project area to meet the needs of wildlife species (e.g., hiding and nesting cover for species that depend on cover for security). Suitable habitat for prey species such as hares, squirrels, and small mammals will be provided; desired goshawk and goshawk prey habitats including foraging, nesting and movement habitats are maintained, restored, or protected.

- Successful aspen regeneration will occur within the project area along with sufficient fuels to maintain or restore historic fire regimes and intervals. A mix of successional stages reflecting properly functioning conditions by vegetation type will exist within the project area.

- Sustained diversity of species will be provided for at genetic, population, community and ecosystem levels. Plant communities will be maintained within their historic range of variation to sustain habitats for viable populations of wildlife. Viability of species-at-risk (including endangered, threatened, and sensitive species and unique communities) will be maintained. Forest Service sensitive species will be managed to prevent them from being classified as threatened or endangered and, where possible, provide for de-listing them as sensitive.

- A balance in sagebrush age-classes and cover ratios to forbs and grasses will be restored, resulting in improved forage and plant composition for both domestic and wild grazing animals. Riparian areas will have variety in herbaceous plant and shrub composition and structure.

1.6 Public Involvement

An important aspect of the environmental analysis process is the participation of the public and other agencies in identifying issues and concerns regarding the potential impacts of a proposal. The issues and concerns are then considered in developing alternative ways of meeting the proposal's purpose and need.

1.6.1 Scoping

On January 8, 1999, a scoping document detailing the proposal and soliciting comments was sent to over 70 individuals, organizations, and agencies on the district mailing list. The proposal was included in the winter 1999 NEPA Quarterly Newsletter for the Forest. A Request for Comments was published in the January 12, 1999 issue of the Logan

Herald Journal and the January 15, 1999 issue of the Uinta County Herald (Evanston, Wyoming). An open house was held at the Logan District office on January 20, 1999. A total of 24 written or oral comments were received in response to the scoping efforts.

In response to public interest expressed in visiting the allotment, the Forest Service hosted a field trip to the North Rich allotment on July 8, 1999. Thirteen members of the public joined the interdisciplinary team members and Forest Service representatives on a field tour of portions of the 27,000-acre allotment.

On February 10, 2000, the Forest Service published a Notice of Intent (NOI) to prepare an EIS for the North Rich Allotment. In consideration of the amount of public interest, the number of public issues raised, and the potential for significant effects to the human environment, the District Ranger decided that an EIS should be prepared. The 30-day comment period for the NOI ended March 10, 2000. Eleven comment letters were received (in addition to the original 24 comments).

1.6.2 Issues and Concerns

The ID Team identified specific issues to be addressed in the EIS based on input from the public, other agencies, and internal comments. The issues guided the formulation of alternatives and provided a framework for the effects analysis documented in this EIS.

1.6.2.1 Aquatic and Semi Aquatic Species

- How would cattle grazing under the proposed action or any of the alternatives affect aquatic habitat and aquatic species found to exist within the waters of the North Rich Allotment?

There are many natural and manmade water sources within the North Rich Allotment. These water bodies may be sources of habitat for a variety of aquatic species. Cattle grazing could have an effect on aquatic populations of vertebrates and invertebrates found to inhabit these waters. The level, timing, and intensity of grazing are important considerations in analyzing the potential effects on aquatic species.

- How would cattle grazing affect Bonneville cutthroat trout populations and how would the provisions of the Conservation Agreement and Strategy for the Bonneville Cutthroat Trout be carried out?

Poor grazing practices can alter sediment transport regimes and streambank stability and can change water quality, substrate composition and channel structure. Specific ramifications include loss of pool habitat, reduced instream cover, increased/decreased water temperatures, and loss of quality substrate required for spawning and food production.

Measurement indicators used to compare alternatives:

a. The degree to which potential aquatic habitat is provided or protected through restoration of degraded riparian areas.

b. The extent of protection afforded to Bonneville cutthroat populations.

1.6.2.2 Heritage Resources

- How would implementation of the proposed action or any of the alternatives affect heritage resources within the North Rich Allotment?

The area within the allotment has been used by small groups of people for as long as 10,000 years. These people include Native American hunters and plant gatherers, as well as Euro-American timber harvesters and livestock grazers. The concern is that livestock grazing and/or associated improvements could physically damage physical evidence of this heritage, such as artifacts or archaeological sites.

Measurement indicator used to compare alternatives:

a. The degree of protection provided for known and unknown archaeological sites.

1.6.2.3 Recreation

- How would the proposal or any of the alternatives affect summer and winter recreation experiences in the area within the North Rich Allotment (referred to as the Sinks Road vicinity)?

The Sinks Road vicinity is a popular dispersed recreation area in the summer, fall and winter, primarily for camping, mountain biking, ATV-riding, hunting, and snowmobile riding. Pasture fences are a concern to some winter forest visitors. Buck and pole fences can be a safety hazard to snowmobile riders going cross country. Wire fences are not as much a problem since they are let down after the grazing season.

Another concern is that some people believe their recreation experience in the Sinks Road vicinity is diminished by the presence of livestock. They do not like to see, hear, or smell cattle when they visit the national forest for recreational pursuits. They feel there is nowhere in the Sinks Road vicinity they can go and not see cows.

Measurement indicator used to compare alternatives:

a. The degree to which summer and winter recreation experiences in the Sinks Road vicinity are affected by the presence of livestock and by fences constructed for range management under the proposed action or alternatives to it

1.6.2.4 Socioeconomics

- What positive or negative socioeconomic impacts would occur under implementation of the proposed action or any of the alternatives?

The local livestock industry and, to a large degree, the local economy of Rich County is dependent on a continual source of available forage on public lands. The lifestyle and traditions associated with cattle grazing are an important factor in the lives of permittees and the rural communities in Rich County. Grazing on public lands has become a part of the ranch culture which has a set of traditional values shared with each successive generation, maintaining a sense of continuity with the past. Changes in livestock management as proposed or in any of the alternatives could impact the lifestyles, traditions, culture, and economic livelihood of the permit holders and local communities. An additional concern is whether or not changes to grazing management would result in a feasible cattle operation.

Measurement indicator used to compare alternatives:

a. The relative degree to which North Rich permittees and Rich County are affected by the proposed action or alternatives to it

1.6.2.5 Vegetation

- How would implementation of the proposed action or any of the alternatives affect upland and riparian vegetation condition and trend?

Some areas of the North Rich Allotment are not at or moving toward desired conditions (as described in Section 1.5.6). A number of factors, including past grazing practices, wildlife use, recreation use, and the exclusion of fire can be associated with the current rangeland vegetation condition. In some areas, ground cover percent, species composition, and ecological status are not as desired. Grazing can cause unacceptable impacts to the vegetation condition if not managed properly.

Riparian areas provide unique habitats for plants and wildlife. Uncontrolled and sustained heavy use of riparian vegetation can result in decreased plant vigor, decreased structural and species diversity, loss of soil productivity, and a potential loss of habitat for wetland-dependant species.

- How would implementation of the proposed action or any of the alternatives affect Threatened, Endangered, or Forest Service Sensitive plant species?

Although no threatened or endangered plant species protected under the Endangered Species Act occur within the North Rich Allotment, suitable habitat does occur within the allotment for some plant species listed as sensitive in the Forest Service Intermountain Region. Three sensitive species that could potentially be affected by the proposal and/or

the alternatives include the Starvling milkvetch (*Astragalus jejunis* var. *jejunis*), Logan buckwheat (*Eriogonum brevicaule* var. *loganum*), and Brownie lady slipper (*Cypripedium fasciculatum*). In addition, Wasatch rockcress (*Arabis lasiocarpa*), a species identified as *rare* by the Utah Natural Heritage Program, occurs just north of the allotment boundary and has potential habitat within the allotment.

Measurement indicators used to compare alternatives:

a. The rate of change and degree to which ground cover and species composition are improved through the proposed action or alternatives to it

b. The degree to which sensitive or rare plants are affected by the proposed action or alternatives to it

1.6.2.6 Water and Soils

- How would the proposal or any of the alternatives affect the hydrologic function of riparian areas and wetlands, soil and water conditions such as wetland function, soil productivity, stream channel and bank stability, and water quality?

Riparian areas and wetlands are influenced by permanent water and include those areas adjacent to streams, springs, seeps, and wetlands. The effects of cattle grazing on riparian condition can include soil erosion and compaction, the loss of vegetation cover from plant consumption or trampling, breakdown of stream banks, widened stream channels, stream bank sloughing, decreased water depths, and higher water temperatures. Stream corridors are particularly attractive to livestock because they are generally highly productive, provide ample forage, water is close at hand, shade is available, and slopes are gentle. Unless carefully managed, livestock can overuse these areas and cause substantial disturbance.

Riparian areas provide unique habitats for plants and wildlife and serve important water quality and stream stabilization roles. Uncontrolled and sustained heavy use of riparian vegetation can result in decreased plant vigor, decreased structural and species diversity, loss of soil productivity, and a potential loss of habitat for wetland-dependant species.

- How would the alternatives affect soil productivity of uplands within the allotment?

Extensive loss of ground cover from heavy grazing can increase runoff and erosion of topsoil by exposing surface soil aggregates to damage and transport from raindrop impact. Excessive soil compaction can reduce water infiltration, resulting in drier soils and harsher conditions that may favor weedy or undesirable plant species.

Measurement indicators used to compare alternatives:

a. The amount and rate of improvement of degraded soil, water, and riparian conditions where they exist, through implementation of the proposed action or alternatives to it

b. The rate and degree to which soil productivity is improved by the proposed action or alternatives to it

1.6.2.7 Wildlife

- How would the proposed action or any of the alternatives affect wildlife species or their habitat? This includes USFWS-listed Threatened, Endangered, Proposed and Candidate species, Forest Service Intermountain Region-listed Sensitive species, Management Indicator Species (MIS), and general species of local concern.

The area within the North Rich Allotment supports a variety of wildlife species and habitats. The area within the allotment serves as linkage habitat for forest carnivores such as the Canada lynx (listed as threatened). The proposed action or alternatives would have varying effects on wildlife species and their habitats, depending on the intensity, timing, and duration of grazing, and the implementation of vegetation improvement projects and riparian fencing.

Measurement indicators used to compare alternatives:

a. The degree to which threatened or endangered wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives to it

b. The rate and degree to which sensitive wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives to it

c. The degree to which neo-tropical migratory birds are affected by the proposed action or alternatives to it

1.6.3 Issues Dismissed

The following issues were identified by the ID Team as not within the scope of analysis, not pertinent to the development of a reasonable range of alternatives, or not necessary for the evaluation of environmental effects (because the effects would be the same for all alternatives):

- The "suitability" of grazing on the North Rich Allotment or other portions of the Logan District.

Rangeland suitability determinations for the WCNF are made at the forest planning level. Forest planning regulations, found at 36 CFR 219.20 regarding the grazing resource, require a determination of rangeland suitability in forest plans. Criteria for assessing rangeland capability and suitability are identified in the Intermountain Region Planning Desk Guide (R-4 Grazing Protocol, 2/20/98). The suitability of the North Rich Allotment was established in the Revised Forest Plan (US Forest Service 2003).

The scope of this analysis is limited to determining if and at what level grazing is appropriate and acceptable to be consistent with laws, regulations, standards and guidelines for the North Rich Allotment (determined to be "suitable" in the forest planning process).

- What are the costs to the government for implementing the proposed action or any of the alternatives?

Forest Service Range Project Effectiveness Analysis Handbook 2209.11 (USDA Forest Service 1998), effective April 1, 1998, noted that following a Washington Office and Regional review the direction to complete an economic effectiveness analysis was no longer applicable at the project level.

An Economic Suitability Analysis was conducted for the Revised Forest Plan and can be found in Appendix B-9 (USDA Forest Service 2003). The analysis meets requirements for an economic suitability analysis for livestock grazing at the Forest level. The analysis gives the deciding official additional information regarding the allocation of lands to livestock grazing management. However, as noted in the Revised Forest Plan, in an appeal decision for the Rio Grande National Forest in Colorado, on the topic of Livestock Grazing Capability and Suitability Determination, the Forest Service Chief stated "I do not...agree with the appellant's contention that if suitability determination reveals that non-grazing values outweigh grazing values, the area should in all instances be deemed unsuitable for livestock grazing." Similarly, the decision in this analysis is not based solely on economic considerations, but on the totality of environmental effects as discussed in Chapter 4.

One of the issues addressed during scoping concerned the costs to the government for administering the grazing program on the Logan District and implementing the proposed action or any of the alternatives in this EIS as compared to the benefits received. Some people feel that the range management program should demonstrate economic efficiency and "pay its way" as a condition to issuing grazing permits.

There are costs associated with analyzing, implementing, and administering range management programs in the Forest Service. The Forest Service administration directs National Forests to provide a range management program where capable and suitable

lands are present. As such, the Forest Service accepts the costs of doing business (administration, resource monitoring and analysis, NEPA planning, etc.) for that directed program.

While financial integrity and accountability of all resource management programs in the Forest Service is a program management priority, the Forest Service is constrained in its ability to positively affect the financial efficiency of agency grazing projects. Grazing fees for permitted livestock use on National Forest Systems lands are designated by Congress in accordance direction incorporated in FLPMA, Sect. 401, and 36 CFR 222.10(a). Under this regulation, currently 100 percent of Forest Service fees are returned to Regions and Forests from which they are generated to be used for range betterment on the allotments from which they were generated. However, under these same regulations, up to one-half per centum of these receipts could be allocated to the U.S. treasury, and not returned to the Forest Service.

These same regulations place a limit on the fee the Forest Service can charge for livestock grazing on National Forest System lands. Federal grazing fees are established through an approved formula. As a result, because the Forest Service is limited in its ability to affect financial returns by increasing grazing fees, and is subject to fluctuations in return of grazing receipts based on Congressional determination, it is limited in its ability to create a positive financial return as measured by traditional economic criteria.

Based on the constraints of federal laws and regulations affecting the financial efficiency of the Forest Service grazing program, economic efficiency as a condition for grazing authorization is considered outside the scope of this analysis. See Appendix H.

- How does recreation use affect rangeland resources and facilities within the allotment?

Recreationists within the allotment have the potential to accidentally or sometimes purposefully damage or destroy allotment fences. They also might leave gates open allowing livestock access to unauthorized areas. Permittees become frustrated when they must bear the consequences of these actions. Some have also voiced concern that recreation users (e.g., campers, ATV riders) are causing a share of the damage to riparian areas and that excluding only cows from riparian areas will not bring about much improvement in riparian conditions.

Riparian fencing, where proposed, will exclude cattle use as well as human use of these riparian areas. Although it is an important issue, disrespectful, illegal, and unauthorized use of ATVs (such as leaving gates open, dispersing cows, or riding on closed trails or roads) is an issue that is beyond the scope of this analysis. This issue must be dealt with in the context of travel planning. Decisions regarding ATV use and enforcement of the Travel Plan are not made within the scope of the North Rich EIS and ROD.

1.7 Permits and Authorizations

Table 1.3 The permits, approvals, authorizations, and consultations that may be required for implementation of the decisions made for the North Rich Allotment, depending on the specific activities associated with each alternative.

Agency	Type of Action	Description of Permit/Action
Forest Service	Forest Service Decision Issuance of a Grazing Permit	The decision to authorize grazing or not to authorize grazing is made for allotments through compliance with the National Environmental Policy Act (NEPA). The AMP implements the applicable management direction from the decision to authorize grazing (if so made), and becomes a term and condition of the grazing permit (FSH 2209.13).
	Preparation of a Biological Assessment (BA)	In accordance with the Endangered Species Act, the Forest Service must complete a BA assessing the impact of the proposed action or any of the alternatives on federally listed threatened or endangered species.
	Preparation of a Biological Evaluation (BE)	In compliance with agency policy, a BE must be prepared assessing the potential impacts to Regional Forester-listed sensitive plant and animal species.
Environmental Protection Agency (EPA)	Review and comment regarding: Federal Water Pollution Control Act, as amended by the Clean Water Act, 33 U.S.C.A. Section 1251-1376 (PL 95-500, PL 95-217) Safe Drinking Water Act, 452 U.S.C.A. Section 300F-300J-10 (PL95-523)	Under NEPA, the EPA is required to review and comment on "major federal actions that have a substantial impact on the human environment." The EPA's responsibility and role is to provide scoping comments, review EISs and provide information and appropriate technical assistance during and following the environmental analysis process. Specific environmental legislation for which the EPA is responsible and which may be applicable to the proposal is shown at left.

Agency	Type of Action	Description of Permit/Action
Fish and Wildlife Service (FWS)	Endangered Species Act, Section 7 Consultation	If impacts to federally listed threatened or endangered species are possible, the Forest Service will consult with the FWS. A Biological Opinion will be issued by the FWS.
State of Utah Department of Natural Resources, Division of Wildlife Resources (DWR)	Review and comment	The DWR is responsible for the management and protection of wildlife and fish resources.
State Historic Preservation Office (SHPO)	Consultation on National Historic Preservation Act, Section 106 (review and compliance process)	SHPO is responsible for the protection of all heritage resources in the state.
Northwest Band of the Shoshone Nation	Consultation on sacred sites	Protection of sacred sites.

Chapter 2
The Alternatives

2.1 Introduction

This chapter describes the formulation of the proposed action and alternatives and discusses the alternatives considered but not analyzed in detail. It also summarizes the environmental impacts of the alternatives and associated mitigation measures.

2.2 Formulation of Alternatives

Subsection 1502.14 of the NEPA regulations require that agencies should "vigorously explore and objectively evaluate all reasonable alternatives" to the proposed action. The alternatives should achieve the same or similar purpose as the proposed action and should address issues raised and include appropriate mitigation measures not already included in the proposed action. Alternatives that would not be reasonable, either because they do not meet the purpose and need or because of other considerations, may be eliminated from detailed study. A brief discussion of the reasons for their having been eliminated is given. An EIS must also "address the alternative of no action", disclosing the effects of not undertaking the actions comprising the proposed action or any of the action alternatives.

The process of formulating alternatives began with the scoping process described in Chapter 1. Analysis of comments identified the following issues as sufficiently important to warrant alternatives addressing them. The substantive issues include: 1) aquatic resources; 2) heritage resources; 3) recreation; 4) socioeconomics; 5) vegetation, including Threatened, Endangered, and Sensitive (TES) plants; 6) watershed, wetlands, and riparian conditions, and 7) wildlife, including TES species.

The Forest Service ID team evaluated the proposed action in consideration of the substantive issues. Alternatives to the proposed action addressing the substantive issues were developed. If alternatives were identified which were not reasonable, they were recorded but not analyzed in detail (see Section 2.3 below).

The resulting range of alternatives is consistent with the purpose and need for action and with the issues raised. Any of the elements included in the proposed action or any of the action alternatives could be implemented independently of each other, and therefore the Forest Service decision maker may ultimately choose and combine elements from any of the alternatives. This analysis fully discloses the effects of all activities considered, regardless of the alternative in which they are included.

2.3 Alternatives Considered and Eliminated from Detailed Analysis

An alternative considered but eliminated from detailed analysis was one that would implement a rest rotation grazing system with the use of riders only (i.e., without pasture fences). This alternative was eliminated because research by Hormay (1970) indicates

that riding to keep cattle in the proper pastures, without the use of fences, is not effective. Historic records from the North Rich Allotment also indicate that riding, without functional pasture fences, is ineffective in keeping cattle in the proper pastures (see Section 3.4.9.3 for further discussion).

2.4 Alternatives Considered in Detail

The interdisciplinary team recommended and the District Ranger approved the following alternatives in addition to the required no action alternative. The alternatives respond to public input and the issues while addressing the purpose and need. Each alternative has specific impacts associated with how it achieves the purpose and need for the project. The impacts are discussed in Chapter 4, Environmental Consequences. Management requirements included in all of the alternatives are shown in Section 2.5. Monitoring activities included in all of the alternatives are provided in Section 2.6.

2.4.1 Alternative A (No Action – Current Management)

The "no action" alternative is included to meet requirements of the National Environmental Policy Act [40 CFR 1502.14 (d)]. Under Alternative A, the no action alternative, there would be no change from current management on the North Rich Allotment.

2.4.1.1 Grazing system and utilization. Grazing would continue the under the season long grazing system. The maximum utilization for uplands and riparian areas would follow the Revised Forest Plan standards and guidelines, listed in Section 2.5.

2.4.1.2 Permitted number of livestock. The number of permitted livestock would be what it is currently, about 1260 head of cattle.

2.4.1.3 Permitted season of use. The permitted season of use would continue to run for any 80 consecutive days between June 16 and September 30.

2.4.1.4 Improvements. Under Alternative A, there would be no improvements such as riparian fencing or sagebrush, aspen, or tarweed vegetation treatments.

Noxious Weeds

The Forest Service would continue to identify areas in need of noxious weed treatments. Noxious weeds will be sprayed according to guidelines in the Risk Assessment for Herbicide Use in Forest Service Regions 1,2,3,4, and 10 (USDA Forest Service 1992). About 50 acres would be sprayed, primarily in Slideout Canyon and Log Cabin Hollow. This alternative, while treating knapweed in the southern portion of the allotment, would not be as aggressive as Alternatives B or D, and would not use biological controls identified in all other alternatives. Further details for treatments are described in Section 2.5.

2.4.1.5 Management Requirements. Management requirements common to all of the alternatives are listed in Section 2.5. In addition, the following requirements are included under Alternative A:

1. Approximately two miles of allotment boundary fence will be constructed by the permittees each year, starting at the south end of the western boundary, where much of the boundary fence is missing.
2. A sufficient number of full-time riders will be provided by the permittees to meet goals, objectives, standards and guidelines for the North Rich allotment. Riders will maintain proper cattle distribution.
3. Permittees are responsible for annual fence maintenance. Failure to maintain fences will result in the appropriate administrative action taken according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, Section 16.2). See Appendix K.

2.4.2 Alternative B (Proposed Action)

As a basis for developing the proposed action, the interdisciplinary team consulted a recent document from the U.S. Environmental Protection Agency entitled "National management measures to control nonpoint source pollution from agriculture" (see full report on the following website: http://www.epa.gov/owow/nps/agmm/index.html). The document includes technical guidance for implementing best management practices (BMPs) for grazing management to reduce nonpoint source pollution from livestock grazing. The proposed action would implement several such BMPs, including a rest rotation grazing system, a more intensive level of herding than is presently practiced (to better manage livestock distribution), riparian fencing, and vegetation treatments.

2.4.2.1 Grazing system and utilization. Under the proposed action, a rest rotation system would be implemented by delineating three pastures within the allotment and allowing use on two pastures while resting one pasture for one or more years. Boundaries between the three pastures would be located along existing roads as shown in Figure 2.1. Utilization rates would be according to Revised Forest Plan standards and guidelines, listed in Section 2.5.

Approximately 12 miles of boundary fence and 9 miles of pasture fence are needed to fill in missing sections of boundary fence and to divide the allotment into three pastures. At least one mile of pasture fence and one mile of boundary fence would be constructed by the permittees each year. The north pasture fence would be constructed before the south pasture fence in order to facilitate proposed treatments to improve rangeland conditions in the northern-most pasture. Boundary fence reconstruction would begin in the southwestern portion of the allotment because the southern and central pastures would be grazed while the north pasture is rested for treatment. The Forest Service typically provides materials for boundary and pasture fence construction and the permittees provide the labor. Given budget constraints, it is expected the Forest Service can provide enough materials for about two miles of boundary and/or pasture fence each year.

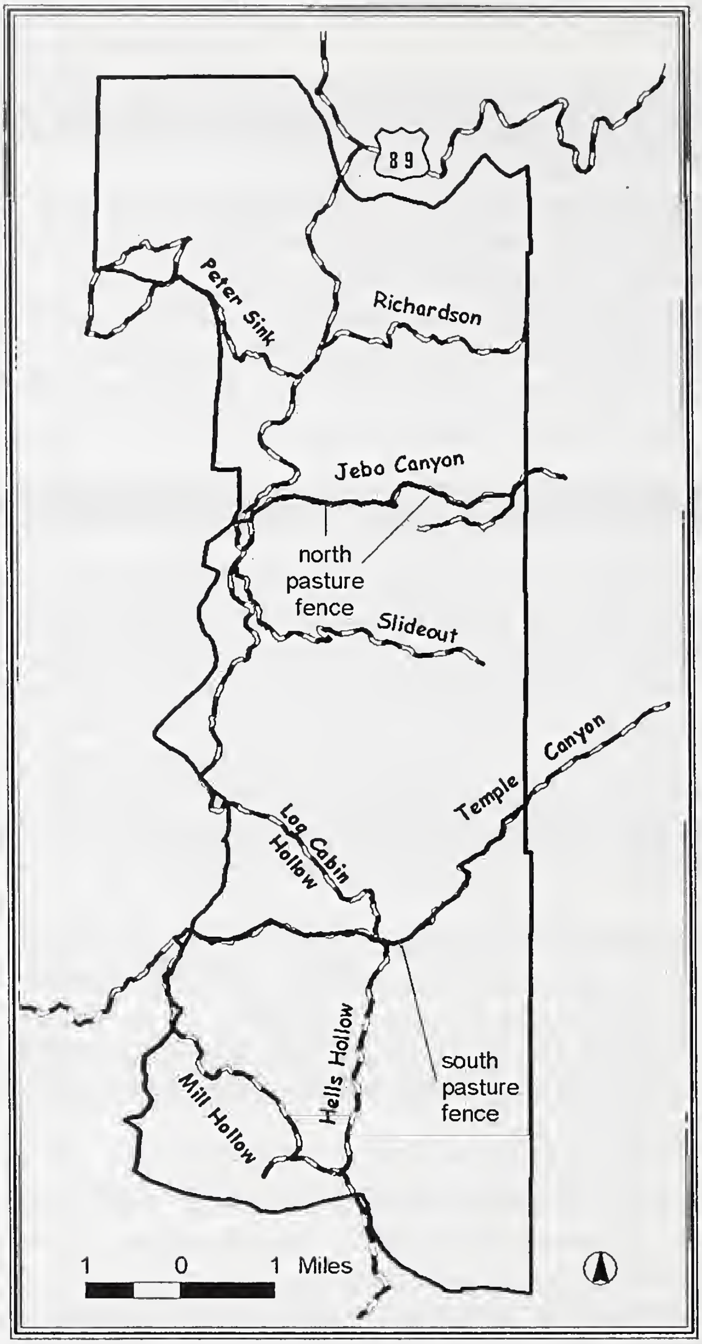


Figure 2.1 Map of the North Rich Allotment showing proposed pasture fence locations. The north pasture fence would be constructed first while the boundary fence reconstruction would begin in the southwestern portion of the allotment.

Herders would be used to keep cattle well distributed within the appropriate pastures until all pasture fences are completed. From two to four herders would be required until the adequate number of herders is determined. The proposed pasture fence locations along existing roads improves access for maintenance compared to the locations of fences constructed in the 1970's (these fences are now nearly non-existent due to poor location, inaccessibility, and poor maintenance). Cattle guards, and possibly gates, would be needed where fences cross roads and/or motorized trails.

2.4.2.2 Permitted number of livestock. Under the proposed action, the allotment would be divided into three pastures, of which only two would be grazed each year. The north pasture is approximately 9,500 acres in size, the middle pasture is about 9,400 acres, and the south pasture is about 8,600 acres. Because only two-thirds of the allotment would be grazed each year, permitted numbers would be reduced by one-third from their current level. Livestock numbers and/or season of use may be adjusted following three years of mapping and monitoring of use and distribution (as discussed in Section 2.6).

The number of *capable acres* within each of the proposed pastures is similar in the north and middle pastures, but substantially greater in the south pasture. *Capable acres* are those rangelands that produce at least 200 lbs/acre, are within one mile of available water sources, and occur on slopes less than 30 %. There are 2,630 capable acres in the north unit, 2920 capable acres in the middle unit, and 4,755 capable acres in the south unit.

2.4.2.3 Permitted season of use. The permitted season of use would run for any 80 consecutive days between June 16 and September 30.

2.4.2.4 Improvements. The Sinks-Log Cabin Hollow Area Analysis (USDA Forest Service 1990) and field reconnaissance during 1999 to 2002 (data and maps available in the project file) identified and recommended areas in need of vegetation treatment and/or fencing to improve resource conditions. The list of potential treatment areas is extensive (see Appendix B). There are several reasons for the magnitude of this list, including, size of the allotment (over 27,000 acres), historical grazing in the early 1900's (cattle grazed in common with sheep over most of the area), and a history of nearly 100 years of fire exclusion. Although we recommend that many or all of these projects be completed sometime within the next decade or two to improve resource conditions on the allotment, it is not feasible or practical to assume we can complete all of them within the next five years. Therefore, we have included in the proposed action only those projects we anticipate implementing within the next five years following the Record of Decision.

Riparian Fencing

About 16 acres in the Government Spring and Hells Hollow riparian areas would be fenced (using wire or buck and pole) to protect the areas from livestock grazing, dispersed camping, and/or motorized use. Cultural resource surveys will be conducted prior to implementation of these projects. Table 2.1 lists the riparian areas that would be fenced under the proposed action.

Table 2.1 Riparian fencing projects on the North Rich Allotment under Alternative B

Location	Approximate Acres	Treatment Description	Reference Codes
Government Spring	4	Fence	NRR04
Head of Hells Hollow	9	Fence	NRR05
Middle of Hells Hollow	3	Fence	NRR06

Vegetation Treatments

Other projects included in the proposed action include treating decadent sagebrush, aspen, and tall forb communities to improve species diversity and ultimately, increase ground cover. The aspen, tarweed, and sagebrush areas treated would coincide with rested pastures as much as possible to facilitate the necessary protection from grazing (as discussed in Section 2.4.2.5, items 5 and 6). Under the proposed action, the following would be implemented in the northern pasture of the North Rich Allotment. Table 2.2 lists the vegetation treatment projects. Locations of the riparian areas to be fenced and vegetation treatment areas are shown in Figures 2.2 and 2.3. Treated sites will be monitored prior to and after treatments to document the effects.

- **Sagebrush.** Three sagebrush areas, about 600 acres total, would be treated with Spike (herbicide treatment), a roto-beater (mechanical treatment), and/or prescribed fire to decrease sagebrush cover and facilitate the seeding and establishment of native grasses and forbs. The areas would be seeded with a native seed mix.

- **Tall Forb.** Two tarweed-dominated areas, about 42 acres total, would receive mechanical or chemical treatment to reduce tarweed cover and encourage establishment of a diversity of native plant species.

- **Aspen.** Four aspen areas, about 800 acres total, would be treated by prescribed fire under the proposed action. Treatment of all four areas would be planned to occur within the same year in order to provide consecutive rest from livestock grazing as needed. The prescribed burns would occur during spring or fall.

  Note: the following explains how the number of "aspen acres treated" was derived. Surrounding each specific aspen ***treatment area***, where fire is specifically directed, is an area referred to as the ***burn boundary***, within which the fire may extend until it meets a fuel break or vegetation change. Prescribed fire is not an exact science and the burn may spread beyond the specific treatment area. Based on past burning experience on the Logan and Ogden Districts, we estimate that about 50% of the acres identified within the larger burn boundary will actually burn. Hence, the ***affected area*** equals the treatment area plus 50% of the burn boundary acres. Because of the vegetation type and natural fuel breaks surrounding the Horse Lake and Upper Hodges Units, these burns are expected to be contained within the treatment areas. Therefore, there are no burn boundaries for these two units. The ***total affected area*** for aspen prescribed fire under the proposed action is about 800 acres. (See Table 2.2 and Figure 2.2)

The aspen treatment units include:

Horse Lake (97-1-2)
About 34 acres treatment area, with an overstory of conifer/aspen; no burn boundary is associated with this unit, so the affected area would be 34 acres.

South Peter Sink (97-1-1)
About 82 acres treatment area, with an overstory of aspen (41 acres), conifer/aspen (36 acres), and a minor component of shrub vegetation (5 acres); a burn boundary of an additional 226 acres is associated with this unit, for an affected area of 195 acres.

Upper Hodges (97-2-8)
About 35 acres treatment area, with an overstory of aspen; no burn boundary is associated with this unit, so the affected area would be 35 acres.

Cheney-Richardson Fork (96-2-1)
About 256 acres treatment area, with an overstory of aspen (91 acres), aspen/conifer (36 acres), conifer/aspen (71 acres), conifer (38 acres), and shrub vegetation (20 acres); a burn boundary of an additional 503 acres is associated with this unit, so the affected area would be about 507 acres. The western portion of this unit occurs on lands managed by the State of Utah, so implementation will be coordinated with the State. A Category 4 Riparian Habitat Conservation Area (RHCA) for "seasonally flowing or intermittent streams (non-priority)" will be established on this unit to protect an area 50 feet on both sides of the stream channel (according to INFISH requirements).

Prescribed fire will be implemented by two methods: by hand ignition (using drip torches and fuses) or by helicopter. Low to medium intensity burns will be proposed for the above units. When implementing a prescribed burn, on the ground activities will include the creation of handline in some instances where defendable lines (road, trail, or natural openings like meadows) are not present. Handcutting will be used in instances where pre-treatment is necessary to provide fuel to ignite and carry a fire or when in a sensitive area where burning is not an option.

Aspen sprouts are often eaten by ungulates (elk, deer, cattle, and/or sheep) following fire. Campbell (1991) recommended that livestock grazing should not be allowed post-burn until leaders are 5 to 6 feet tall to assure adequate regeneration. We are proposing to rest treatment areas one year prior to burning from livestock grazing to allow for the build up of fuels to provide adequate ignition. Also, livestock would not be allowed in the burned units until aspen sprouts in those stands have leaders reaching 5 to 6 feet in height, and a density of greater than 2500 sprouts/acre when 3 feet tall. This may take as little as one growing season or as long as 5 to 6 years depending on site conditions, but usually occurs within 2 to 3 years. The goal is to achieve approximately 400 well-formed stems/acre when 13 feet tall (USDA Forest Service 1985). Fencing (primarily electrical) may be installed around burned areas to reduce grazing impacts.

Noxious Weeds

As under all other alternatives, the Forest Service would continue to identify areas in need of noxious weed treatments. About 50 acres would be treated, primarily in Slideout Canyon and Log Cabin Hollow, and an emphasis placed on eradicating spotted knapweed in the southern portion of the allotment. In addition to chemical treatments identified in Section 2.5, biological controls would be applied to control existing populations of dyers woad. The biocontrol agent is a natural fungal pathogen (*Puccinia thlaspeos*), which damages dyers woad plants enough to provide control, not eradicate plants, while not infecting any other plant growing nearby. If eradication of knapweed was unsuccessful and expansion of the population makes it necessary, knapweed seedhead gall flies (either *Urophora affinis* or *U. quadrimaculatus*) would be used to control seed development of spotted knapweed while eradication efforts continue.

Table 2.2 Vegetation treatment projects on the North Rich Allotment under Alternative B.

Location	Cover Type	Acres	Treatment	Reference Codes (Figures 2.2 and 2.3)
Horse Lake	Aspen	34	Prescribed Fire	97-1-2
South Peter Sink Area	Aspen	195	Prescribed Fire	97-1-1
Upper Hodges	Aspen	35	Prescribed Fire	97-2-8
Cheney – Richardson Fork	Aspen	507	Prescribed Fire	96-2-1
Middle Sink	Sagebrush	30	Spike, Rotobeat, or Prescribed Fire & Seed	NR928-01, NRU14
South Sinks	Sagebrush	160 + 170 + 70 total = 400	Spike, Rotobeat, or Prescribed Fire & Seed	NR928-02, NR-1, NRU-11
Peter Sinks	Sagebrush	100 + 65 total = 165	Spike, Rotobeat, or Prescribed Fire & Seed	NRU19, RU01-62
South Sinks	Tall Forb	42	Mechanical or Chemical Treatments	SSINK-2, RU01-50, NRT1
Slideout, Log Cabin Hollow	Noxious Weeds	50	Chemical Treatments and/or Biocontrol	-

Figure 2.2 Map of riparian treatments (NRR04, NRR05, and NRR06) and aspen treatment projects (97-1-2, 97-1-1, 97-2-8 and 96-2-1) on the North Rich Allotment under Alternative B.

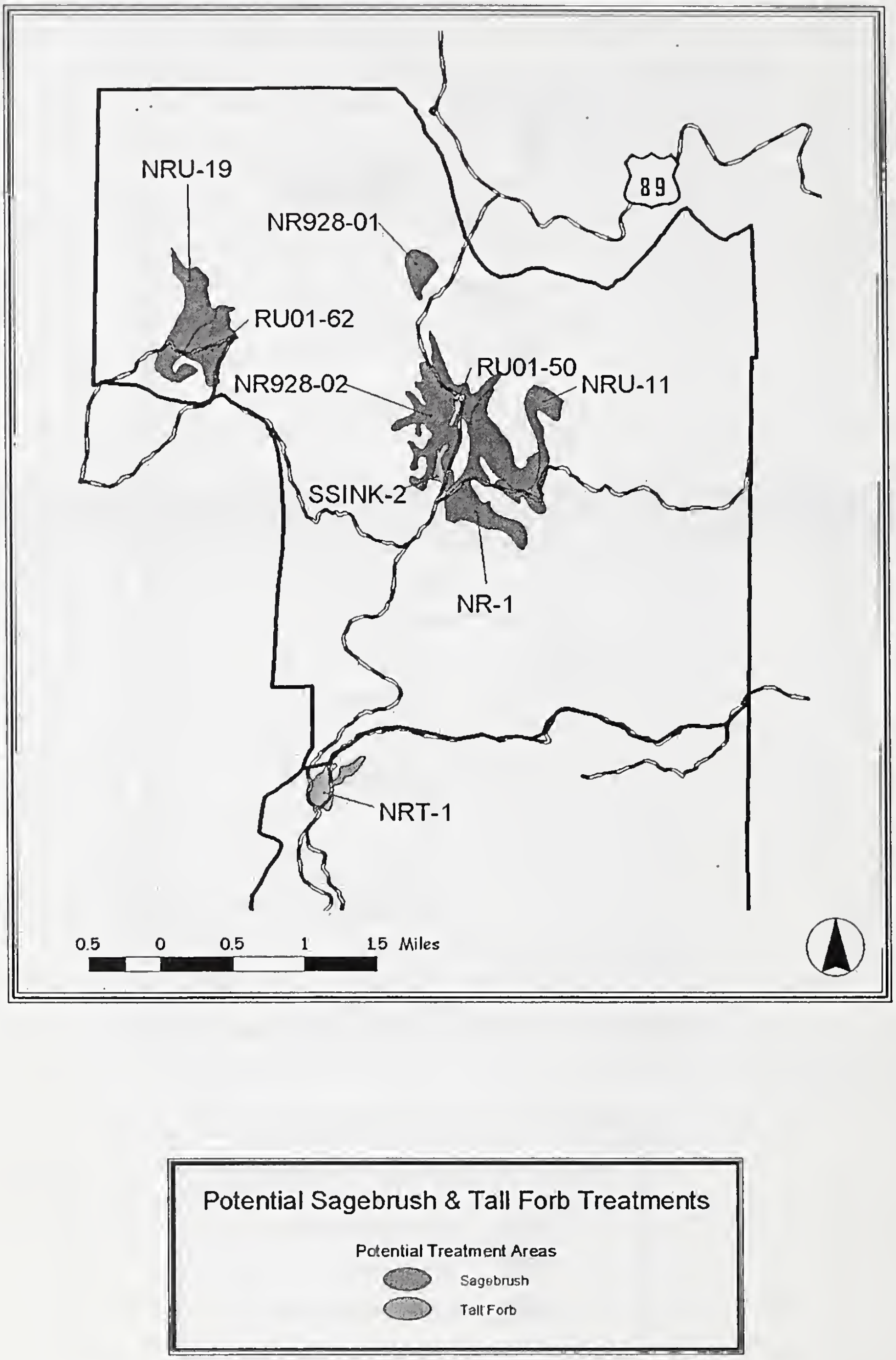


Figure 2.3 Location of sagebrush and tall forb treatment projects on the North Rich Allotment under Alternative B.

2.4.2.5 Management Requirements. Management requirements common to all of the alternatives are listed in Section 2.5. In addition, the following requirements are included under the proposed action:

1. Permittees will construct approximately one mile of pasture fence and one mile of allotment boundary fence each year. Materials will be provided by the Forest Service. The boundary fence work will start at the south end of the western boundary, where much of the fence is missing.

2. A sufficient number of full-time riders will be provided by the permittees to meet goals, objectives, standards and guidelines for the North Rich Allotment. Riders will keep cattle confined to designated pastures and maintain proper cattle distribution. If standards and guidelines are exceeded or cattle are consistently found in a non-use area, such as a rested pasture or fenced riparian area, it is considered excess use and appropriate administrative action would be taken according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, Section 16). See Appendix K.

3. Permittees will be required to keep a daily log of all herding activities including locations and time spent. This will be submitted to the Forest Service periodically and at the end of each grazing season.

4. Permittees are responsible for fence maintenance. Failure to maintain fences will result in the appropriate permit action according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, Section 16). See Appendix K.

5. Livestock grazing will not be allowed in aspen treatment units until aspen sprouts have leaders reaching an average height of 6 feet (typically 2 to 3 years). The most critical time-period to avoid browsing on aspen leaders is during September to October (Campbell 2001, pers. comm.). If needed, temporary fences will be installed until these conditions are achieved (Forest Plan Guideline 73).

6. Permittees will keep cattle out of treated tarweed and sagebrush sites for two growing seasons or until desired perennial species are well established.

2.4.3 Alternative C (No Grazing)

This alternative was developed by the interdisciplinary team in response to public comments received during the scoping period, asking for elimination of livestock grazing on the allotment. Under Alternative C, grazing would be eliminated from the North Rich Allotment after three years.

2.4.3.1 Grazing system and utilization. Under Alternative C, livestock grazing on the North Rich Allotment would be eliminated after a three-year period. Permittees would be notified two years prior to the cancellation of their permits in accordance with 36 Code of Federal Regulations 222.4. The maximum utilization for uplands and riparian areas would follow the Forest Plan standards and guidelines, listed in Section 2.5, until grazing was eliminated.

2.4.3.2 Permitted number of livestock. There would be no permitted livestock use on the allotment following the three-year phase-out period. Until then, permitted numbers would be the same as they are currently.

2.4.3.3 Permitted season of use. The permitted season of use would run for any 80 consecutive days between June 16 and September 30 until grazing was eliminated from the allotment.

2.4.3.4 Improvements. Under Alternative C, there would be no improvements such as riparian fencing or sagebrush, aspen, or tarweed vegetation treatments.

Noxious Weeds

As under all alternatives, the Forest Service would identify areas in need of noxious weed treatment. While noxious weeds would be sprayed according to guidelines in the Risk Assessment for Herbicide Use in Forest Service Regions 1,2,3,4, and 10 (USDA Forest Service 1992), an emphasis would be placed on the use of biological control agents. About 50 acres would be treated, primarily in Slideout Canyon and Log Cabin Hollow. As with Alternatives B and D, an emphasis would be placed on treating spotted knapweed in the southern portion of the allotment, but with the use of biological controls for knapweed and dyers woad. Further details for treatments are described in Section 2.5.

2.4.4 Alternative D (Two Pasture, Deferred Rotation)

Alternative D was developed in response to socioeconomic issues and concerns raised from the DEIS about the effects of a reduction in livestock numbers on permittees' livelihood. Some respondents believe that range condition can be improved and the rangeland resource protected without reducing livestock numbers. To address these concerns, Alternative D reduces the number of pastures (and pasture fences) and maintains livestock numbers at about 1260 head, and puts emphasis on water developments and riding to improve cattle distribution. Vegetation treatments and riparian fencing, as described in the proposed action, would be implemented.

2.4.4.1 Grazing system and utilization. Under Alternative D, a deferred rotation system would be implemented by delineating two pastures within the allotment, north and south (Figure 2.4). The fence location would be along a road or otherwise be accessible for annual fence maintenance. The two pastures would have approximately equal grazing capacities (based on the amount of forage available on capable acres, with 50% use on satisfactory lands and 35% use on unsatisfactory lands), although the size of the two pastures would not necessarily be equal. This is explained in detail in Section 3.4.6 Grazing Capacity.

Under this system, the sequence of use of each pasture is alternated annually to vary the timing of grazing and delays grazing in a pasture until the seed maturity of key forage species (Holechek et al. 2001). Use is deferred or delayed on alternating pastures each year, but no pasture receives rest for an entire year. For example, the north pasture would

be grazed for about half the grazing season, (or until 50% and 35% utilization standards are met on satisfactory and unsatisfactory key areas, respectively). The south pasture would then be grazed for the remainder of the grazing season, until utilization standards are met on key areas in the south pasture. The next year the order of grazing would be reversed from the south to the north. Utilization rates of 50% and 35% apply to Alternative D as well as all of the alternatives, as established in the Revised Forest Plan standards and guidelines and listed in Section 2.5, Management Requirements Common to All Alternatives.

Approximately 12 miles of boundary fence and 5 miles of pasture fence are needed to fill in missing sections of boundary fence and to divide the allotment into two pastures. As in the proposed action, at least one mile of pasture fence and one mile of boundary fence would be constructed by the permittees each year. The Forest Service typically provides materials for boundary and pasture fence construction and the permittees provide the labor.

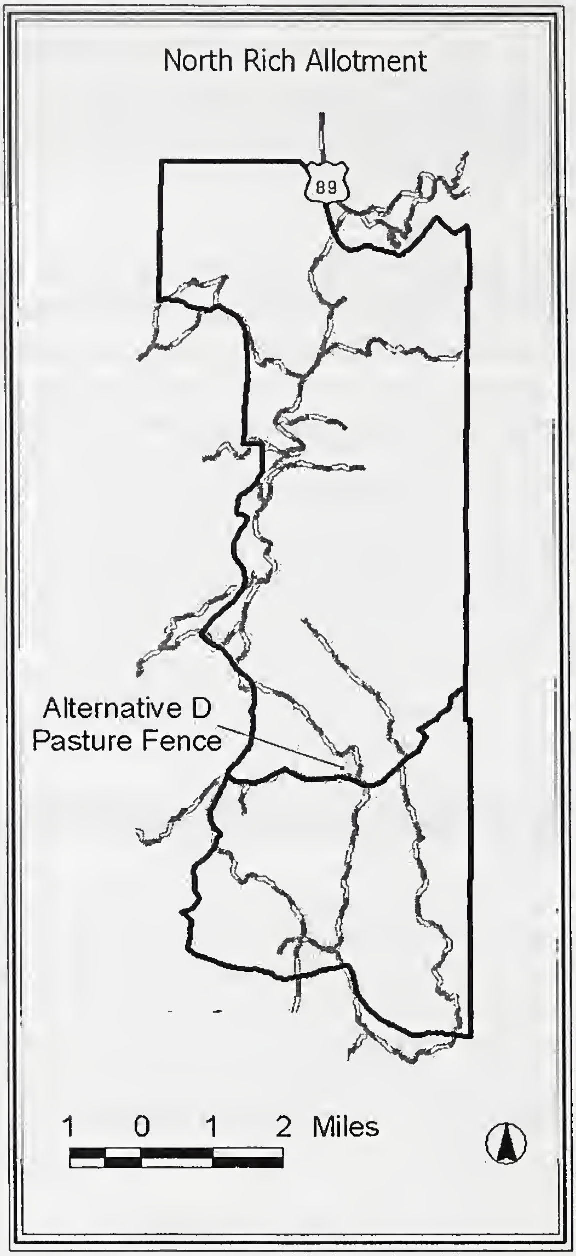


Figure 2.4 Map of the North Rich Allotment showing proposed 2-pasture fence location.

2.4.4.2 Permitted number of livestock. Under Alternative D, the allotment would be divided into two pastures, each of which would be grazed for about half the permitted season annually. Livestock numbers would remain at their current number, about 1260 head. Herding and water developments would be used to manage use and distribution of cattle. The number and/or season of use may be adjusted following three years of mapping and monitoring of use and distribution (as discussed in Section 2.6).

2.4.4.3 Permitted season of use. The permitted season of use would run for any 80 consecutive days between June 16 and September 30.

2.4.4.4 Improvements. Alternative D includes the same vegetation treatments and riparian fencing as described in the proposed action (Section 2.4.2). Treated sites will be monitored prior to and following treatments to document effects. An emphasis would be placed on completing an inventory of current water developments for location and condition. Ponds and structures that are not functioning properly or situated in poor locations would be dismantled. New water developments to help distribute cattle better will be constructed as needed.

Noxious Weeds

As under all alternatives, the Forest Service would continue to identify areas in need of noxious weed treatments. About 50 acres would be treated, primarily in Slideout Canyon and Log Cabin Hollow, with an emphasis placed on eradicating spotted knapweed in the southern portion of the allotment. Use of biological control agents, such as that described under Alternative B for dyers woad, would be used. If eradication of knapweed was unsuccessful and expansion of the population makes it necessary, knapweed seedhead gall flies would be used to control seed development of spotted knapweed while eradication efforts continue. Further details for treatments are described in Section 2.5.

2.4.4.5 Management Requirements. Management requirements common to all of the alternatives are listed in Section 2.5. In addition, the following requirements are included under Alternative D:

1. Permittees will construct approximately one mile of pasture fence and one mile of allotment boundary fence each year. The Forest Service will provide materials. The boundary fence work will start at the south end of the western boundary, where much of the fence is missing.

2. A sufficient number of full-time riders will be provided by the permittees to meet goals, objectives, standards and guidelines for the North Rich allotment. Riders will keep cattle confined to designated pastures and maintain proper cattle distribution. If standards and guidelines are exceeded or cattle are consistently found in a non-use area, such as a rested pasture or fenced riparian area, it is considered excess use and appropriate administrative action would be taken according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, Section 16). See Appendix K.

3. Permittees will be required to keep a daily log of all herding activities including locations and time spent. This will be submitted to the Forest Service periodically and at the end of each grazing season.

4. Permittees are responsible for fence maintenance. Failure to maintain fences will result in the appropriate permit action according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, Section 16). See Appendix K.

5. Livestock grazing will not be allowed in aspen treatment units until aspen sprouts have leaders reaching an average height of 6 feet (typically 2 to 3 years). The most critical time-period to avoid browsing on aspen leaders is during September to October (Campbell 2001). Temporary electric fences will be installed for the first year or longer, if needed to protect regeneration until these conditions are achieved (Forest Plan Guideline 73).

6. Permittees will keep cattle out of treated tarweed and sagebrush sites until desired perennial species are established (typically 2 to 3 years). Temporary electric fences will be installed until these conditions are achieved.

2.5 Management Requirements Common to All Alternatives

The following Forestwide utilization standards and guidelines are included in all alternatives. Research and information substantiating these requirements are found in the Rangeland Health EIS (USDA Forest Service 1996) and the Revised Forest Plan and FEIS (USDA Forest Service 2003), available in the project file.

a. Maximum utilization of key forage species on satisfactory rangelands is 50% (Forest Plan Standard 24).

b. Maximum utilization of key forage species on unsatisfactory rangelands is 30-40% (Forest Plan Guideline 71).

c. Maximum utilization for browse is 50% of current annual growth (Forest Plan Standard 26).

d. Following are maximum utilization standards for riparian communities away from the greenline (Forest Plan Standard 25).

Riparian Class	Percent Utilization Key Species
1	50
2 and 3	60

e. Following are maximum utilization standards (stubble height) for low to mid elevation greenline species in riparian classes 1, 2, and 3 in satisfactory condition. Key riparian species being grazed include water sedge (*Carex aquatilis*), Nebraska sedge (*C. nebrascensis*), and/or wooly sedge (*C. lanuginosa*) (Forest Plan Standard 25).

Riparian Class	Stubble Height At End of Growing Season
1	5-6"
2	4-5"
3	3-4"

f. Noxious weeds would be sprayed according to guidelines in the Risk Assessment for Herbicide Use in Forest Service Regions 1,2,3,4, and 10 (USDA Forest Service 1992). A combination of Picloram, Dicamba, Glyphosate, 2,4-D, and/or Chlorsulfuron would be used to treat Dyers Woad, Leafy Spurge, Black Henbane, knapweed, and musk thistle. Each of these herbicides is registered by the U.S. Environmental Protection Agency. Treatments are made within manufacturers' label restrictions and agency administrative directions.

2.6 Monitoring Activities Common to All Alternatives

The following monitoring activities would be conducted by the Forest Service under **each alternative** to evaluate range conditions and to ensure compliance with the grazing permit and management requirements listed in Sections 2.4.1.5, 2.4.2.5, 2.4.4.5, and 2.5.

1. **Livestock management inspections**

    ***What*:** Monitor livestock distribution to ensure cattle are in areas designated for grazing.

    Why: To protect non-use areas (such as fenced riparian areas or rested pastures) from cattle grazing to help achieve desired conditions.

    ***How often*:** Throughout the grazing season (or until grazing is eliminated under Alternative C).

    ***How the results will be used*:** Information would be documented and shared with the permittees to ensure cattle are in the proper pastures. If cattle are found in a non-use area, such as a rested pasture or fenced riparian area, it is considered excess use and appropriate administrative action would be taken according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, section 16). See Appendix K.

2. **Annual Upland and Riparian Utilization and Use Monitoring**

    What: Annual monitoring will include collecting and recording the following information:

    a. Utilization on upland and riparian key areas; and
    b. Mapping of cattle distribution and use each season

    Why: To maintain proper cattle distribution and ensure utilization standards and guidelines are not exceeded in order to maintain satisfactory conditions and help move toward desired conditions.

    How often: Throughout the grazing season (or until grazing is eliminated under Alternative C).

    How the results will be used: The information will be used to determine when livestock must be moved from one pasture to another or off the allotment after both units have been grazed, and to make adjustments to numbers if necessary. If cattle are found in a rested pasture, or are found on the allotment before or after permittees have been instructed to move them, it is considered *excess use* and appropriate administrative action would be taken according to Forest Service Handbook direction (FSH 2209.13, Chapter 10, section 16). See Appendix K.

For detailed information on annual monitoring, see Appendix I, Annual and Long Term Monitoring for the North Rich Allotment.

3. Upland/Watershed/Riparian Condition and Trend

What: Long term trend monitoring will include the following methods on previously established sites and additional sites determined through field assessment. The methods for uplands include nested frequency, line intercept, ground cover measurements, and photo points as described in the Revised Forest Plan (USDA Forest Service 2003) and RHEIS (USDA Forest Service 1996). Methods for monitoring riparian areas include green line, cross-section, and woody species regeneration as described in the Region 4 Riparian Evaluation Guide (USDA Forest Service 1994) and the RHEIS

Why: To evaluate vegetation conditions and identify whether or not these areas are at or moving toward desired conditions in riparian and upland areas.

How often: Every 5 years.

How the results will be used: Information will be used to determine if the area is meeting or moving toward desired conditions, and if necessary, to adjust livestock numbers and/or season of use. Under Alternative C, results would provide information regarding the effects of eliminating grazing from the allotment. For detailed information on long term monitoring, see Appendix I, Annual and Long Term Monitoring for the North Rich Allotment.

4. Water quality monitoring

What: Monitoring methods will include Pfankuch stream stability rating (Pfankuch 1975) and photo points inside and outside of fenced riparian areas.

Why: To ensure that wet environments are protected from trampling and vegetation loss.

How often: Once every 5 years.

How the results will be used: The information will be used to evaluate movement toward desired conditions in riparian areas and under Alternative C, to evaluate the effects of eliminating grazing from the allotment.

5. Wildlife Monitoring

What: Management Indicator Species (goshawk, beaver, snowshoe hare, sagebrush indicator community, and Bonneville cutthroat trout) and neo-tropical migratory birds.

Why: To assess the effects of management activities on a range of species.

How Often: As directed within the Revised Forest Plan, Chapter 4, Monitoring and Evaluation, pages 4-104 through 4-117 (USDA·Forest Service 2003).

How the results will be used: To make adjustments or changes in management activities if monitoring discloses substantial downward trends due to actions related to management activities.

2.7 Comparison of Alternatives

Table 2.3 Comparison of differences among Alternatives A (No Action), B (Proposed Action), C (No Grazing), and D (Deferred Rotation).

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Permitted Numbers	Approximately 1260 head	Approximately 1/3 reduction from current numbers (about 800 to 900 head), then monitor for adjustments	Approximately 1260 head until grazing is eliminated from the allotment in 3 years, then no grazing	Approximately 1260 head, then monitor for adjustments
Grazing System	Season-long within the entire allotment, 80 days, during June 16-Sept. 30	Rest rotation, 3-pasture system, 80 days, during June 16-Sept. 30	Season-long within the entire allotment, 80 days, during June 16-Sept. 30 for 3 years, then no grazing	2-pasture, deferred rotation, 80 days, during June 16-Sept 30
Utilization	50 percent use on uplands in satisfactory condition; 30-40 % use on uplands in unsatisfactory condition; riparian greenline stubble heights at the end of the growing season of 4-5 inches on Class 2 riparian areas and 5-6 inches on Class 1 riparian areas	Same as Alternative A	For 3 years, same as Alternative A, then no grazing	Same as Alternative A
Herders	2 herders – 40 hours a week	2 to 4 full-time herders, 7 days per week, for the first year then number of full-time herders would be adjusted according to implementation needs	2 herders - 40 hours a week until grazing is eliminated	Same as Alternative B

	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Structural Improvements	Construction of about 2 miles of allotment boundary fence annually and annual maintenance of ponds and existing fences	Construction of about 1 mile of pasture fence and about 1 mile of allotment boundary fence annually; annual maintenance of ponds and fences; about 16 acres riparian fencing (as shown in Table 2.1); Total fence needed is 12 miles boundary fence and 9 miles pasture fence	Annual maintenance of ponds and existing fences until grazing is eliminated	Same as Alternative B (except that total fence needed is 12 miles boundary fence and 5 miles pasture fence).
Vegetation Treatments	None	About 600 acres sagebrush, 42 acres tarweed, and 800 acres aspen would be treated (as shown in Table 2.2)	None	Same as Alternative B
Noxious Weed Treatment	About 50 acres sprayed each year	Same as Alternative A, but with emphasis on eradicating spotted knapweed.	Same as Alternative A, but with emphasis on eradicating spotted knapweed.	Same as Alternative A, but with emphasis on eradicating spotted knapweed.

2.8 Comparison of Effects

Table 2.4 Comparison of the effects of Alternatives A (No Action), B (Proposed Action), C (No Grazing), and D (Deferred Rotation).

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #1 – Aquatics **a. Effect on aquatic species and their habitat**	No improvement of degraded riparian conditions outside of exclosures, due to continuation of season-long grazing and concentration of cattle in these areas. Protection for boreal toad is provided by the exclosure around Tin Cup Spring.	Improvements will be observed in riparian areas due to lower stocking rate, a rest-rotation grazing strategy, and riparian fencing projects. Protection for boreal toad is the same as Alternative A.	Riparian areas will recover the quickest under this alternative. Gradual loss of still-water habitat (stock ponds) will occur as stock ponds dry up, since they will no longer be maintained for cattle grazing. Protection for boreal toad is the same as Alternative A.	Small improvement in riparian conditions due to a deferred grazing system and riparian fencing projects. Recovery will be slower than Alternatives B and C, but quicker then Alternative A. Protection for boreal toad is the same as Alternative A.
b. Effect on Bonneville cutthroat trout	Not likely to impact individuals or habitat. Protection from cattle grazing is provided by the Hells Hollow Exclosure (entire population is located within the exclosure).	Same as Alternative A	Not likely to impact individuals or habitat. Approximately two miles of riparian fencing (Hells Hollow Exclosure) would be removed after grazing is eliminated.	Same as Alternative A
Issue #2 – Heritage Resources **a. Effect on heritage resources**	Most negative impacts on heritage resources; damage to known and unknown archaeological sites will continue from grazing in sensitive areas such as riparian zones.	Riparian fencing would protect sensitive riparian areas, where heritage resources are typically found, from cattle trampling.	Direct effects to the known archaeological sites will largely diminish as grazing is eliminated.	Same as Alternative B

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #3 – Recreation **a. Effect on recreation experiences and opportunities**	Recreation experiences would continue to be affected for those who prefer not to see or interact with cows while hiking, biking, sightseeing, or on other recreation outings.	Recreation experiences would improve for those individuals who do not like to see or interact with cattle since there would be locations available within the allotment that are rested from cattle grazing each year. Winter recreation experiences (snowmobiling) may be negatively affected by 9 miles of newly-constructed pasture fences.	Recreation experiences would improve after grazing is eliminated, for those who do not like to see or interact with cattle while on recreation outings.	Effects would be essentially the same as Alternative A because the evidence of cattle grazing would still be visible, since each pasture would be rested only a portion of each year. The potential for snowmobile conflicts with newly-constructed pasture fences would be slightly less than Alternative B because only 5 miles of pasture fence would be constructed.
Issue #4 – Socioeconomics **a. Effect on permittees and the local economy**	Most beneficial to local communities and permittees.	Permittees responsible for costs for additional 2 to 4 herders for the allotment and labor for 21 miles of fence construction. Implementing rest-rotation pasture system would require permittees to reduce their stock by about 1/3, thus they can expect reduction in income by approx. 33%. Impact on local communities would be minor.	Greatest negative impact on permittees and local communities. Eight grazing permits would be phased out. Some permittees may go out of business.	Permittees responsible for costs for additional 2 to 4 herders for the allotment and labor for 17 miles of fence construction. There would be no reduction in livestock numbers, which would maintain income based on number of head. Impact on local communities would be minor.

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
Issue #5 - Vegetation **a. Effect on upland vegetation condition and trend**	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas remain lower than the desired condition. Very slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a low to moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to be eradicated.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.	On average, ground cover conditions on grazed sagebrush and tall forb dominated areas show a low to moderate upward trend toward the desired condition. Slow rate of change in grazing-induced seral vegetation communities. Moderate overall effect to noxious weeds. Spotted knapweed likely to expand its occurrence.
b. Effect on T,E,S and recommended Sensitive plant species	Little or no effect	Little or no effect	No effect	Little or no effect
Issue #6 – Watershed, Soils, Wetlands, Riparian **a. Effect on soil and water and riparian conditions**	Slowest rate of improvement of soil and water resources because of no change from current management except for lowered utilization standards. Lowered utilization standards for unsatisfactory condition rangeland will result in some improvement to soil condition and ground cover. Season-long grazing would continue to degrade riparian areas because livestock tend to concentrate and linger in these areas.	A faster rate of improvement over Alternative A will occur from rest rotation grazing and better herding practices. Sagebrush, tarweed, and aspen treatments will result in rapid improvements in treated areas. Improvement projects such as fencing will rapidly improve specific riparian areas.	All upland areas will see a slow improvement because of removal of soil compaction from livestock trampling. Water quality will improve from reduced amounts of animal waste and sediment entering streams from livestock. All riparian areas will improve fastest under this alternative.	A moderate rate of improvement over Alternative A will occur from deferred rotation grazing and better herding practices. Sagebrush, tarweed, and aspen treatments will result in rapid improvements in treated areas. Improvement projects such as fencing will rapidly improve specific riparian areas.

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
b. Effect on upland soil productivity	Soil productivity will improve in areas of unsatisfactory condition rangeland mainly from lowered utilization standards for these areas. The soil productivity will likely stay the same or improve slowly in the remainder of the upland areas because no change in management from current management.	Soil productivity will improve faster than Alternative A because of rest rotation grazing system. Rapid improvements would occur in sagebrush, tarweed, and aspen treatment areas.	Soil productivity will improve throughout the uplands of the allotment because of the reduced soil compaction and vegetation loss that occurs from livestock grazing. The rate of soil improvement will be slow because soil development occurs slowly.	Effects on upland soil productivity would be similar to Alternative A except a slight increase in vegetative residue may occur from the deferred rotation grazing, compared to the current season-long grazing system. Like Alternative B, rapid improvements would occur in sagebrush, tarweed, and aspen treatment areas.
Issue #7 – Wildlife **a. Effect on threatened and endangered wildlife species and their habitat**	For lynx, essentially no change to the current condition. No effect for other threatened or endangered species.	For lynx, positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.	For lynx, greatest positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.	For lynx, slight positive affect on prey species abundance and diversity. No effect for other threatened or endangered species.
b. Effect on sensitive wildlife species and their habitat	For goshawk, flammulated owl, and wolverine, essentially no change to the current condition. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, positive effect on prey species abundance and diversity. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, greatest positive affect on prey species abundance and diversity. No effect or little effect for other sensitive species.	For goshawk, flammulated owl, and wolverine, slight positive effect on prey species abundance and diversity. No effect or little effect for other sensitive species.

Issue	Alternative A (No Action)	Alternative B (Proposed Action)	Alternative C (No Grazing)	Alternative D (Deferred Rotation)
c. Effect on Neo-tropical migratory birds	This alternative would provide habitat conditions for those species that prefer habitat with less understory cover.	This alternative would provide habitat conditions for a range of species, those that prefer habitat with higher amounts of cover and those which prefer less.	This alternative would provide habitat conditions for those species that prefer habitat with high amounts of understory cover.	This alternative would provide habitat conditions for a range of species, but tend toward those species that prefer habitat with less understory cover.

2.9 Identification of the Preferred Alternative

There is no preferred alternative identified at this time. The decision (to be documented in a forth-coming Record of Decision) will likely be a combination of actions considered in the FEIS.

Chapter 3
The Affected Environment

3.1 Introduction

This chapter provides a summary of the physical, biological, and social-economic (human) resource conditions that could be affected by the proposed action and the alternatives to it, providing a baseline from which comparisons can be made for the effects analysis (Chapter 4). The CEQ regulations direct agencies to succinctly describe the environment that could be affected commensurate with the importance of the impacts (40 CFR 1502.15). The information is provided by resource/discipline in the same order as Chapter 1 (Issues) and Chapter 4 (Effects).

3.2 Aquatic and Semi Aquatic Species

The purpose of this section is to explain and clarify the existing conditions of the aquatic and semi aquatic species and their habitats that could be affected by the proposed action or any of the alternatives to it.

3.2.1 Area of Influence

For direct, indirect and cumulative effects of livestock grazing on aquatic and semi-aquatic species, the area of influence is the North Rich Allotment. The allotment is at the head of three different watersheds (Logan River, Blacksmith Fork, and Bear Lake watersheds). However, the allotment has little influence on their aquatic resources because: 1) there are no perennial flows to fish bearing streams or lakes outside the allotment, and 2) there are limited flows within the allotment. See also Water and Soil Resources, Section 3.8.1.

3.2.2 Existing Conditions

Water features contained within the North Rich Allotment include perennial streams, intermittent streams, springs and ponds. These areas provide only limited habitat for fish. Good habitat for amphibians and a variety of invertebrate species is available in springs and ponds.

Intermittent and ephemeral streams that originate within the North Rich Allotment and drain toward the east do not and have never contained any fish. These areas draining into the Bear Lake watershed include Hodges, Richardson, Cheney, Jebo, Slideout, Tufts, Temple, and Dry Canyons, and small parts of Edgar, Birch and Cottonwood Canyons. Most of these streams are diverted for agricultural use and do not typically make it to Bear Lake. Because of this, activities conducted on the National Forest are unlikely to influence the Bear Lake fishery.

From north to south, areas within the allotment that drain toward the west into the Logan River watershed include small areas at the very headwaters of Little Bear Creek, Hodges Creek, Temple Fork, and Right Hand Fork of the Logan River. These areas are high in the drainages, have low gradients and no running water and have little influence on the fishery resources of the Logan River drainage.

Log Cabin Hollow, Bear Hollow, and Mill Hollow drain into Hells Hollow and are tributaries of Saddle Creek at the headwaters of the Blacksmith Fork drainage. Saddle Creek goes underground and is an intermittent stream for approximately six miles beyond the North Rich allotment boundary.

Field surveys conducted in 2000-2003 on the North Rich Allotment found Bonneville cutthroat trout (*Oncorhynchus clarki utah*) and brook trout (*Salvelinus fontinalis*) as discussed below. Amphibian species found within the allotment include boreal toad (*Bufo boreas boreas*) and tiger salamander (*Ambystoma tigrinum*).

Brook trout are not a very important component in Utah's trout fishery (Sigler and Sigler 1996). They have the ability to sustain themselves in small high-mountain streams and will eat about anything. Within the North Rich Allotment, brook trout are offered the same protection from grazing as Bonneville cutthroat trout within the Hells Hollow exclosure. This small population of brook trout within the exclosure may be removed in the future by the Utah Division of Wildlife Resources to reduce competition with and predation on the Bonneville cutthroat trout. The methods and timing of this removal by UDWR are unknown at this time.

Tiger salamanders are common throughout Northern Utah and are found in several stock ponds within the North Rich allotment. This species does not appear to be negatively impacted by grazing and may be more abundant now than historically due to the increased amount of habitat available in the form of constructed stock ponds.

3.2.3 Threatened, Endangered, and Sensitive Aquatic and Semi Aquatic Species

No threatened or endangered aquatic or semi aquatic species occur within the vicinity of the North Rich Allotment.

A sensitive species, the Columbian spotted frog, is not found in Rich or Cache Counties (Stebbins 1985) and will not be affected by activities within the North Rich Allotment.

Two aquatic and semi-aquatic sensitive species are found within the allotment, the Bonneville cutthroat trout (USFS Intermountain Region sensitive species) and the boreal toad (State of Utah sensitive species).

Bonneville Cutthroat Trout. Bonneville cutthroat trout (BCT) are currently listed as a USFS Intermountain Region sensitive species and a Management Indicator Species (MIS) on the Wasatch-Cache National Forest. They are the only native trout found in the

Bonneville Basin, which includes portions of Idaho, Nevada, Utah, and Wyoming. Cutthroat trout were distributed in all suitable waters of the Basin when Europeans reached the region (Behnke 1992). Currently, Bonneville cutthroat trout exist only within fragmented components of their historical range. Recent surveys indicate over half of the remaining populations of Bonneville cutthroat trout are found on the Wasatch-Cache National Forest (USDA Forest Service 2003).

A small population of Bonneville cutthroat trout occurs in the headwaters of Saddle Creek within the North Rich Allotment (including small portions of Hells Hollow and Mill Hollow; see Figure 3.1). This population occupies less than one mile of stream, all within the Hells Hollow exclosure. A beaver dam prevents fish from moving further up Mill Hollow, while infrequent flows prevent fish from occupying more of Hells Hollow and Saddle Creek.

A stream survey was conducted within the exclosure on June 28, 2000, in which 100 meters of stream was electro-fished. Twenty-six age-1 and older Bonneville cutthroat trout (262 ± 10/ stream km [421 ± 16/ stream mile]) were captured during this sampling. Most of the Bonneville cutthroat trout appeared to be 1 or 2 year old fish. During a subsequent electro-fishing survey, brook trout were also captured.

Saddle Creek becomes an intermittent stream for about the next six miles below the exclosure and contains no fish. Beyond this point, Saddle Creek again becomes perennial and cutthroat, brook, and brown trout (*Salmo trutta*) are found (Cowley 1996). For an explanation of the hydrology of the Hells Hollow/ Saddle Creek complex, see Water and Soil Resources, Section 3.8.

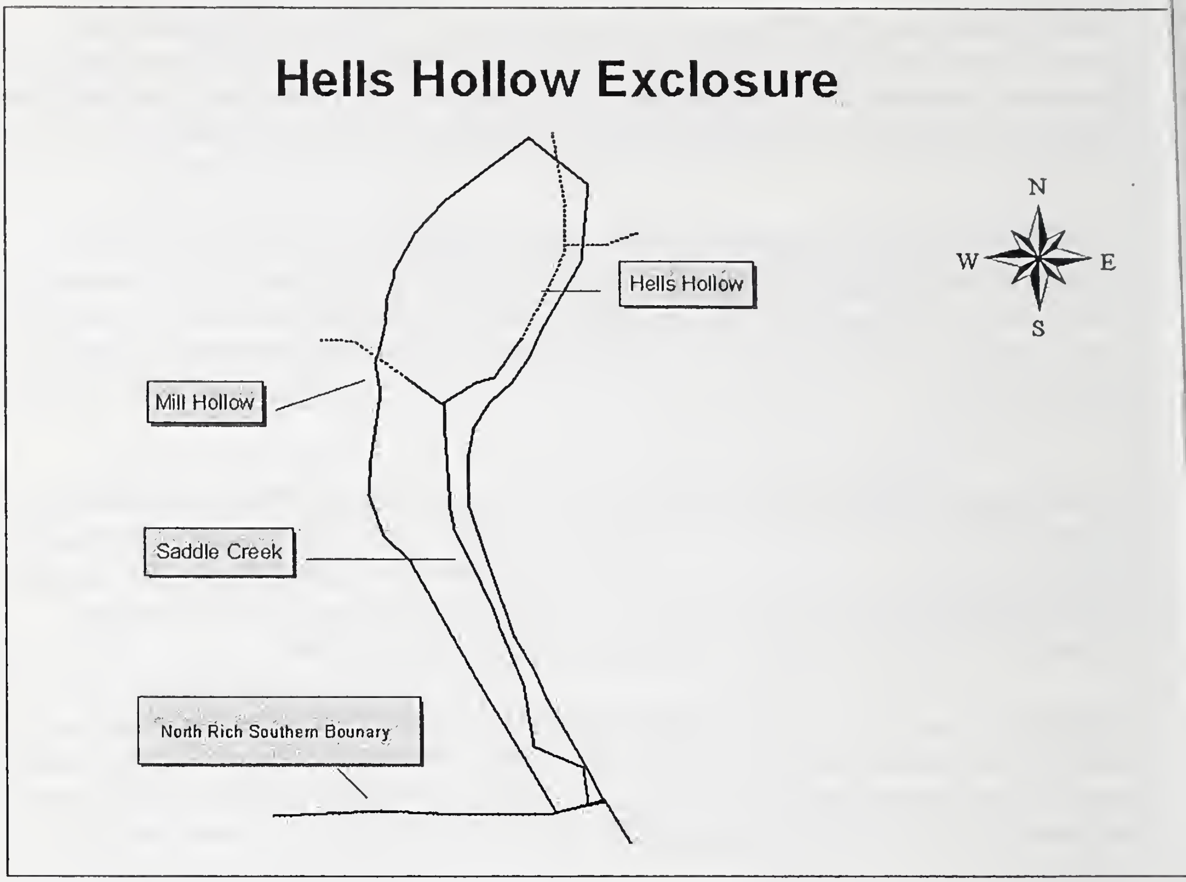


Figure 3.1 Bonneville cutthroat trout present in lower Hells Hollow, lower Mill Hollow, and upper Saddle Creek (all within the exclosure during low flows). The solid line indicates where BCT are found, while the dashed line indicates no fish present (June 2000).

This population of Bonneville cutthroat trout is small and may disappear in the future. This is due to several factors, including the limited number of fish present, isolation from other populations, missing year (age) classes, limited habitat, and the presence of brook trout. The Hells Hollow exclosure offers protection from livestock grazing, although some cattle were documented within the exclosure in 1999 and 2000 (field notes available in project file).

Despite the presence of occasional cattle within the exclosure, riparian conditions are improving. A riparian survey conducted on June 24, 1992 prior to riparian fencing found streambank stability was poor and estimated that only 15% of the streambank was stable (data records available in the project file). During the stream survey of June 2000, streambank stability was estimated at 80-85%. In the summer of 2001, beaver constructed several ponds, which provide the Bonneville cutthroat trout with a deep-water refugium during the fall and winter low water periods. Surveys will be conducted again in 2005 to monitor the cutthroat population.

Cutthroat trout generally spawn in the clear, cold, shallow riffles of small streams soon after the ice is off in the spring. Spawning initiation is influenced by water temperature, runoff, ice melt, elevation, and latitude (Hickman and Raleigh 1982). Male cutthroat trout in some populations mature at ages 2 or 3, females mature a year later (Hickman and Raleigh 1982).

Stream habitat most advantageous to cutthroat trout is characterized by clear, cold, relatively silt-free with rocky substrate in which riffle:pool ratios are approximately 1:1 (Hickman and Raleigh 1982, Sigler and Sigler 1996). Cover is an essential factor. They prefer summer water temperatures of about 59 ^{O}F, but can survive in water up to 70 ^{O}F (Hickman and Raleigh 1982). Areas occupied by Bonneville cutthroat trout range in elevation from 3,300-11,500 ft (1,000-3,500 m) (Kershner 1995).

Declines in Bonneville cutthroat trout populations elsewhere have been attributed to hybridization with introduced trout (rainbow and other sub-species of cutthroat trout), competition with and predation by introduced fish, loss and fragmentation of habitat from man-made causes such as water diversions, overgrazing of riparian areas, poor timber harvest practices, poor road and trail building practices, and water pollution (Behnke 1992, Kershner 1995, Sigler and Sigler 1996, NatureServe 2000). Another historical problem has been overfishing (NatureServe 2000).

Boreal Toad. The Boreal toad is currently listed as a State of Utah sensitive species. Boreal toad, also known as the western toad, are found in the southern portions of Alaska and across the boreal forests of Canada south into Washington, Oregon, Idaho, Montana, Nevada, and Utah. Small populations are also found in California, Colorado, Wyoming, and New Mexico (Stebbens 1985).

Amphibian surveys conducted on the Wasatch/Cache National Forest during the past four years (2000 to 2003) focused primarily on determining the distribution of boreal toad. Over fifty sites were surveyed for amphibians within the North Rich Allotment (map located in the project record). Surveys were conducted at springs, stockponds, beaver ponds, and within streams. Boreal toad have been found in only one locality in the allotment, Tin Cup Spring. This site includes several springs that flow into a stockpond. Water flows from the stockpond and feeds Bear Wallow. Boreal toad have been found in the stream below the stockpond, the stockpond, and the main spring. Cattle grazing and trampling have removed most of the vegetation surrounding the stockpond and stream (Figure 3.2). No boreal toad reproduction had been documented at Tin Cup Spring until the spring of 2003. In 2003, over 5,000 boreal toad tadpoles were found. An exclosure was completed in 2003 around Tin Cup Spring. This exclosure should protect this population in the future. Adult boreal toad will be pit-tagged at Tin Cup Spring and other locations to determine population sizes and track movement.

Boreal toad occupy a wide variety of habitats including: mountain meadows, grasslands, forests, and deserts. Within these habitat types, toads are most commonly found in the vicinity of a water source such as streams, springs, ponds, lakes, reservoirs, and stock ponds, but they are capable of traveling several kilometers across dry terrain (Stebbins

1985). Breeding habitat is characterized by shallow reservoir, wet meadows, stock ponds, and stream backwaters. Vegetation associated with breeding habitat includes: sedges (*Carex* spp.), cattails (*Typha* spp.), grasses, willow (*Salix* spp.), reeds (*Phragmites*), and algae. Hibernacula can consist of rodent burrows, beaver lodges, and beaver dams. A continuous flow of groundwater is necessary to prevent freezing (Campbell 1970).

In Utah, emergence from hibernacula generally occurs in April and May, coinciding with snowmelt (Loeffler et al. 1998). Breeding typically occurs from April to early July, although amplexed toads have been observed as late as mid-July (Hogrefe 2000, personal communication). Egg strands are often found entwined in vegetation in shallow water. Egg and tadpole development is temperature dependent. Tadpoles have been observed migrating to the warmest area in a breeding pool to expedite growth and development . In Utah, metamorphosis typically occurs from mid-July to mid-August. Reproductive efforts occasionally fail because ponds dry up prior to tadpole metamorphosis (Campbell 1970).

Boreal toad historic distribution in northern Utah included many high elevation canyons (7,500 – 12,000 feet) and mountains of Salt Lake, Utah, Juab, Summit, Wasatch, Rich, and Cache counties (Stebbins 1985, Loeffler et al. 1998). Currently, boreal toad populations are absent from the majority of these historically occupied habitats (Thompson 1999). The reasons for the decline of the boreal toad have not been defined with any degree of certainty. Most habitat alterations from timber harvest, grazing, recreation, and water development would likely not be beneficial to long-term enhancement of boreal toad habitats (Loeffler et al. 1998). Road construction and development has probably impacted the toad. A threat to boreal toad populations in Utah is habitat degredation due to livestock grazing (Holgrefe 2000, personal communication). Livestock can trample and crop emergent vegetation and severely degrade water quality, and consequently, eliminate suitable habitat for breeding and egg development (Stebbins and Cohen 1995). Livestock further prevent successful reproduction by trampling eggs, tadpoles, and metamorphs found in and near breeding ponds. Additionally, soil compaction by hoof action can prevent boreal toads from finding suitable hibernacula. One benefit of livestock grazing for amphibians is the creation of water developments (stockponds). These ponds create additional habitat and important breeding sites.

Figure 3.2. Tin Cup Spring on the North Rich Allotment.

The photo in Figure 3.2 shows cattle trails and lack of vegetation around the edges of the area below the spring. Habitat conditions at other springs, ponds, and streams within the North Rich Allotment are similar. Cattle spend a disapportionate amount of time near water, and as a consequence, these areas are often in poor condition and provide limited habitat for boreal toad. The photo also shows a non-functioning water trough.

3.2.4 Aquatic Invertebrates

Aquatic invertebrates. Aquatic invertebrate sampling was conducted on the North Rich Allotment on Cheney Creek in 1999 and on Saddle Creek in 2002 (field notes available in the project file). Small portions of these streams are perennial. Based upon invertebrates collected at these two sites, there appears to be no organic enrichment of the streams. Numerous clean water taxa were collected. To date, none of the aquatic invertebrate species identified as species at risk in the Revised Forest Plan have been found within the project area.

According to the Revised Forest Plan (USDA Forest Service 2003), aquatic invertebrate species present a unique situation because most survey work for these species has been very spotty and accomplished prior to 1950. Questions exist regarding the classification and identification of aquatic invertebrates at the species and subspecies level. There has been no forest-wide survey of invertebrates to determine species composition and distribution. According to the Revised Forest Plan, Forest direction will be to inventory streams and terrestrial habitats used by invertebrates to ascertain what is present and to

determine the distribution of different species. With this information, the Forest can then develop conservation strategies and agreements, as necessary. At present, the Forest relies on surrogate measures such as grazing and riparian guidelines for conservation of aquatic invertebrates. Additional information related to aquatic invertebrates is available in the Revised Forest Plan, FEIS, Appendix B-2.

3.3 Heritage Resources

The purpose of this section is to explain and clarify the existing conditions of the heritage resources that could be affected by the proposed action or any of the alternatives to it. .

3.3.1 Area of Influence

The area of influence for heritage resources under this analysis covers the North Rich Allotment.

3.3.2 Existing Conditions

Native American Era. Human use of the North Rich Allotment area and Rich County in general has been long and varied. Native American hunters and plant gatherers began using this area about 8,000 years ago. Native Americans came into these areas as part of a seasonal migration route across the landscape, using the natural resources as they encountered them. Bulbs, seeds, nuts, insects, rodents, as well as larger animals such as deer and elk were used by prehistoric people. Based on the presence of a prehistoric bison kill site south of the project area in Rich County, Native Americans also enjoyed bison meat and hides.

Bear Lake and Bear River were important resources to Native Americans. The shores of Bear Lake were likely used as a summer/fall meeting place throughout history by the ancestors of the Shoshone, Bannock, and Ute Indians.

The North Rich Allotment is characterized as extremely dry. Even though it is unlikely that large prehistoric encampments or villages were established in the North Rich Allotment area due to the lack of water, evidence of prehistoric use appears in the form of archaeological sites. Six archaeological sites were recorded during cultural resource inventories of portions of the North Rich Allotment. Four of the six sites are lithic scatters or areas where people practiced stone tool making. Two of the sites are related to Euro-American settlement of the area. All four lithic scatters were discovered near springs, which is not surprising given the arid nature of the North Rich Allotment. None of the sites produced artifacts that could be assigned to a certain period or date in prehistory; however, their presence indicates use of the North Rich Allotment area (Parson 1996, Parrie 2000).

European Settlement. The historic period of Rich and Cache counties begins with the arrival of fur trappers in 1811. John Miller of the John Jacob Astor Fir Company appears to have been the first European to make contact with Native American groups living in or around the Bear Lake area (Rich County). The dominant Native American culture at the time of first contact with Europeans in Rich and Cache County were the Shoshone Indians. The Bear Lake region and Bear River Valley of Rich County were important to the American fur trade history. Many famous figures of western United States and Utah history, such as Jedediah Smith, Jim Bridger, and John K. Weber, traveled through present day Rich and Cache counties searching for beaver pelts. From 1827 to 1830, the

southern shore of Bear Lake became the center for the American trapping business. In 1827, the first rendezvous or annual gathering of trappers, traders, and Native American groups, occurred near present-day Laketown. Rendezvous served as a way for trappers and Native Americans to exchange information, socialize, and outfit their groups for the coming year.

The first government survey of the area was conducted in 1832 by Major Benjamin Bonneville. In 1842, John C. Fremont, famous for his explorations and activities in the creation of California, entered Bear River Valley and commented on the abundant grasses and good farming land. It would be another decade before Mormon pioneers would create permanent settlements in the Bear Lake Valley.

Based on Fremont's and other explorers' comments, Mormon President Brigham Young seriously considered the Bear Lake and Bear River Valleys as the settlement location for the Midwest Mormons upon entrance to Utah in 1847. Although described as "good country" in numerous accounts, Rich County had some characteristics that would make it difficult to settle and farm. Rich County has a short growing season and the high elevation would make agriculture difficult for settlers. Lack of easily, available water in Bear River Valley also caused concern and problems for Mormon settlers. In addition, Young knew that the Bear Lake area was the territory of the Shoshone people, led by Chief Washakie. Based on the Mormon experience in adjacent Cache County, Young wanted to avoid conflicts with Native Americans at all costs. It wasn't until after the Homestead Act of 1862 was passed that Young realized if Mormons did not gain a foothold in the region, then non-Mormon people would, thus he stepped up efforts to settle Rich County. After the Battle Creek massacre of Shoshone Indians by the U.S. Army on January 29, 1863, the Cache and Rich County lands were considered opened for full settlement by European Americans. Charles C. Rich was the first settler in Rich County in September 1863.

Mormon settlement initially occurred near Bear Lake due to its better agricultural land, lumber sources, and water resources. Laketown was established in 1864 and Meadowville and Round Valley soon followed. Retention of settlers was difficult due to the harsh climate and initial limited agricultural successes. The southern part of Rich County or Bear River Valley was off-limits to European settlers until Charles C. Rich successfully arranged a treaty with Chief Washakie and the Shoshone Indians in 1866. Randolph was settled in March 1870 while settlers arrived to Woodruff in 1871. Randolph became the county commercial center particularly after the railroad arrived to Evanston, WY. The Oregon Shortline Railroad was built in 1883 and Randolph was only 18 miles from its connection in Sage Junction.

The area around Woodruff was already inhabited in a sense prior to Mormon settlement. During the 1860s, large livestock operations out of Wyoming established ranches in Bear River Valley, such as A.C. Beckwith from Granger, WY and William Crawford, for whom the Crawford Mountains were named. Woodruff was settled in 1871 from Mormon emigrants from Bountiful. In general, Bear River Valley was a harsh place to live. The environment was unpredictable and the climate severe. The Shoshone warned

settlers that a 4-year cycle of harsh to mild winters was present in the valley and settlers soon realized that warning was true. Although non-Mormon cattle ranchers dominated the Bear River Valley during the 1880s and 1890s, they eventually left the area when profits were not high and sold their land to the long-term, enduring Mormon families of the valley.

Early settlers of Bear Lake Valley were able to grow wheat and vegetables. Successful agriculture was more difficult to establish in Bear River Valley and most settlers invested in livestock rather than cultivation of cereal crops. Insufficient irrigation water has been a continual problem for Rich County. Laketown, Round Valley, and Meadowville constructed canals in 1888 to harness the waters of Big Spring and Laketown Canyon. The Newlands Act of 1902 allowed the federal government to partner with western states to develop dams and improve irrigation systems. Several canals were constructed to direct water from the Bear River to arid Bear River Valley lands.

Livestock and ranching form the base economy of both Bear Lake and Bear River Valleys in the past as well as today. Although cattle was present in Rich County at an early time, sheep raising quickly grew in popularity, particularly after Deseret Land and Livestock, a sheep company, purchased large amounts range land in southern Rich County. When the Forest Service was created in 1905, its first mandate was to manage the problems (i.e., erosion) associated with sheep and cattle overgrazing. This mandate led to the removal of most sheep from the forest reserves and the creation of a permit system to manage grazing on appropriate public land. n 1922, Utah supported the placement of the remaining unreserved public lands under federal protection and restricted use of the land to those who would sign long-term leases with the government. In 1934, Congress passed the Taylor Grazing Act, which placed all the remaining public lands under the U.S. Grazing Service (now the Bureau of Land Management [BLM]). More than a quarter of the land of Rich County was included in this Act and today 170,000 acres in the county are administered by the BLM.

Logging of the North Rich allotment and Rich County in general has occurred from the settlement of the valleys through the present with lumber providing for the construction of houses, towns, and railroads. The General Land Survey maps of the 1880s report a sawmill located just outside the North Rich Allotment boundary.

From the Native American era on, Bear Lake has been a popular recreation site. Growing at faster and faster rates since the 1950s, Bear Lake Valley has witnessed a large increase in interest for recreation properties on or near Bear Lake. Although Rich County's income is still heavily dependent on the ranching and agricultural community, more local families are involved in businesses relating to recreation such as resorts, hotels, restaurants, and summer homes, instead of the traditional commodity-based activities. Recreational use has always been a characteristic of the North Rich area although use has increased over the last 30 years as society's general interest in and demand for recreational activities has increased. Instead of horseback riding and hiking as the predominant use, new kinds of recreational users such as ATV riders and mountain bike riders, appreciate the terrain of the North Rich allotment. Currently hiking, horse

riding, bike riding, and ATV use occur within the North Rich allotment (Parson 1996, Parrie 2000).

Cultural Resource Investigations. Cultural resource surveys for proposed projects on the Wasatch-Cache National Forest are conducted in a phased approach. First, a records search of previous survey projects is completed for the project area. Depending on the scope of the alternatives, a preliminary inventory is conducted. This broad level survey is to get an idea or understanding of the project area in order to address any cultural resource concerns at the broad scale. In the case of the North Rich Allotment, areas identified by resource specialists as most heavily impacted (i.e. riparian areas with compacted soil) were inventoried for cultural resources.

Depending on the scope of the analysis, a second phase of cultural resource inventory that involves site-specific surveys after an alternative has been selected may be conducted. At this point, specific locations of ground-disturbing activity, such as fence locations and vegetation treatments are surveyed for the presence of cultural resources. If cultural resources are located, generally, site-specific projects are adjusted to avoid impacting the sites.

Throughout this process, legal requirements of consulting with interested tribal parties as well as the State Historic Preservation Officer (SHPO) are fulfilled by presenting them an opportunity to comment on the results of survey reports as well as the NEPA document itself. In November 2001, Patty Timbimboo-Madsen of the Northwestern Band of Shoshone Nation was informed about the North Rich Allotment EIS. On May 31, 2002, Ms. Timbimboo-Madsen and Jennifer Eberlien, Forest Archaeologist for the WCNF, met and discussed the results of the cultural resources surveys as well as the North Rich AMP EIS in detail. Ms. Timbimboo-Madsen had no concerns with the project, provided that the four lithic scatter sites were protected from damage. On May 31, 2002, the results of the cultural resource surveys for the North Rich Allotment were forwarded to the Utah SHPO for comments. The SHPO letter of concurrence and determination of “no adverse effect” is on file in the project record.

Current Status. Fifteen cultural resource surveys have been conducted within or adjacent to the North Rich Allotment over the past 25 years (Table 3.1). As a result of those fifteen surveys, six sites have been recorded in the North Rich Allotment.

The six sites that have been recorded within the North Rich Allotment were discovered during the most recent survey specifically completed for the North Rich Allotment (field notes available in project file). These sites include: four prehistoric lithic scatters (located near springs), one historic trash scatter, and one historic carved aspen grove. Lithic scatters reflect the Native American use of spring locations in a harsh, dry environment. The presence of historic trash and carved aspen trees by sheep or cattle herders reflect the more recent, historic use of the area primarily for ranching and grazing purposes. Although trees are engraved for a variety of reasons, carved aspens, with dates and names recorded, have been associated with sheep and cattle herders throughout the American west.

Table 3.1 Previous Cultural Resource Surveys Within or Near North Rich Allotment

Survey Name	Date Conducted	Results
Log Cabin Timber Sale (WS-76-15)	1976	Negative (no sites recorded)
Sinks Sno-mo Parking Lot (WS-76-31)	1976	Negative
Tufts Creek Timber Sale (WS-76-32)	1976	Negative
Sinks Road Relocation (WS-76-29)	1976	Negative
Jebo Creek Timber Sale (WS-78-70)	1978	Negative
Tuft's Creek/Slideout Timber Sale (WS-78-80)	1978	Negative
Peter Sink's Timber Sale (WS-79-93)	1979	Isolated Artifact
South Sink Road (WS-82-177)	1982	Negative
Upper Jebo/Tuft's Creek Timber Sale (WS-82-180)	1982	Negative
Log Cabin Hollow Timber Sale (WS-85-302)	1985	Negative
Slideout Timber Sale (WS-90-458)	1990/1992	Negative
Bear Hodges Timber Sale (WS-98-567)	1998	Negative
Logan Road Decommissions (WS-01-612)	2001	Negative
Cache-Aspen Prescribed Fire Units (WS-01-615	2001	Negative
North Rich AMP Surveys (WS-01-614)	2001	6 sites recorded

Although fifteen cultural resource surveys have been completed within and adjacent to the North Rich Allotment, most have been inventoried for timber sales or road relocations. These are projects generally located on upland, forested areas. In contrast, surveys conducted for the North Rich Allotment concentrated on springs, where grazing impacts are most evident and soil and vegetation conditions are considered unsatisfactory. The six sites recorded within the North Rich Allotment were discovered in one survey that looked only at high probability sites and spring sites with the most resource damage. This cultural site density and pattern reflects the arid nature and harsh climate of the North Rich Allotment, where prehistoric and historic people who used this area primarily concentrated their living near water resources.

3.4 Range Management

The purpose of this section is to explain and clarify how the North Rich allotment is currently managed.

3.4.1 Grazing Allotments on the Logan Ranger District

The North Rich allotment is one of 26 grazing allotments on the Logan Ranger District of the Wasatch-Cache National Forest. These include 12 cattle and 14 sheep allotments on a total of 211,743 acres. A total of 5,672 cattle and 13,456 sheep are permitted to graze on the District (see project file for details by allotment) involving about 80 permittees.

3.4.2 General Administration of the North Rich Allotment

The North Rich allotment is a designated area of land within the Logan Ranger District in which cattle are permitted to graze. It includes lands east of the Logan Canyon Highway from the Bear Lake Summit on the north to Saddle Creek on the south. The North Rich allotment directly adjoins all or parts of eight other Forest Service grazing allotments including the following six sheep allotments (Beaver Mountain and Swan Peak to the north, Little Bear and Long Hollow to the west, and Ephraims Grave and Elk Valley to the southwest), and two cattle allotments (Franklin Basin to the northwest and Saddle Creek to the south). Privately owned land adjoins the eastern boundary of the North Rich Allotment.

About 1260 head of cattle are permitted to graze within the allotment. Individuals who hold Forest Service Term Grazing Permits own the cattle. One permittee also holds a permit to graze on lands owned by the State within the allotment. The Forest Service administers this State grazing permit. Currently, seven individuals (permittees) hold permits allowing their cattle to graze within the North Rich Allotment. Two permittees own land adjacent to the allotment, four permittees have their base facilities in nearby Laketown, Utah, and one has his base property in Garland, Utah. Permittees either herd or truck their cattle on to the allotment at the beginning of the grazing season.

In 1994 the District Ranger approved a revised Allotment Management Plan (AMP) for the North Rich allotment (available in the project file). The AMP outlines direction for proper management of the cattle operation and protection and care of the resources. Allotment management plans are generally written to give direction for the allotment and supplemented by Annual Operating Instructions (AOI).

Prior to the start of the grazing season, (the specified period of time that cattle are allowed to graze on the allotment) operating instructions are written and agreed to by the Forest Service and the permittees. The AOI provide information to the permittees on maintenance specifications of range improvements (fence and water developments), where cattle can graze within the allotment, when they should be moved to another area,

herding requirements, where to place salt, and utilization standards. Utilization standards indicate the allowable amount of forage to be consumed by livestock while grazing on the allotment without detriment to resource conditions.

The Forest Service is responsible for administering the grazing permit and its terms and conditions. If permittees are found in non-compliance with any of the terms, appropriate administrative action is taken (FSH 2209.13, Section 16.21).

On the North Rich allotment, cattle are permitted to graze for 80 consecutive days sometime between June 16 and September 30. The actual date is determined by resource conditions on the allotment. Forest Service personnel conduct a range readiness check of the allotment shortly before the cattle turnout date (the date cattle are actually placed on the allotment). This check determines whether the allotment is ready to receive cattle grazing use and is based on range conditions such as soil moisture and forage plant phenology (the stage of growth of the forage plant). Allowing cattle to graze prior to the range being ready can result in adverse effects to resource conditions. During dry years, it is often necessary to end grazing on the allotment early. This has been the case for the past few years.

The North Rich allotment is currently managed as one large grazing unit. Under this season-long grazing system, cattle are not restricted to any one area of the allotment (as compared to a rotation grazing system where cattle are moved from one pasture to another during the grazing season). Often, the permittees hire a herder to help with cattle distribution over the allotment.

3.4.3 Grazing History

The area within the North Rich allotment has a history of livestock use dating back to the 1880s. Between July 1, 1902 and November 22, 1902, Albert Potter, former Associate Chief of the Forest Service, traveled and described land conditions throughout much of Utah. His surveys included the Bear River Range east of Logan, Utah (the proposed Cache Reserve at that time). Here Potter saw heavy grazing (both sheep and cattle) and particularly high numbers of sheep, estimated to be about 150,000, on the proposed Cache Reserve. Several large areas, particularly along the ridges and upper watersheds, were heavily grazed, trampled, and lacking grasses. He said extensive timber cutting and fire had occurred in much of the area. (A copy of Albert Potter's survey is available in the project file). Potter had traveled through the Bear River Range close to the peak of livestock use. The number of sheep in Cache Valley rose from 10,000 in 1880 to about 300,000 in 1900 and then declined thereafter when the Cache Reserve (and later, the Cache National Forest) was established and federal grazing controls instituted (Arrington and Wilcox 1989).

The area within the current North Rich allotment was originally part of three allotments, including portions of the Laketown, Garden City, and Willow Springs allotments. These allotments were grazed by cattle and sheep (common use) from the time they were placed

under Forest Service administration until 1940, when exclusive cattle use was established on four sections of land. Records indicate that around 1,000 cattle and 3,000 sheep grazed on the area from 1921 to 1940, and the season of use was from May 16 to October 15 (150 days).

During the years 1941 to 1962, 1,000 to 2,000 cattle and 3,000 to 5,000 sheep grazed on the present allotment, with common use occurring over much of the allotment. In 1941, the grazing season was reduced to 120 days (June 16 to October 15). In 1944, the permittees requested earlier use of the range. The season was changed to June 6 to October 5, but remained 120 days long. This season of use remained in effect until 1963.

During the 1940s and 1950s, correspondence between the Forest Service and the permittees indicated that livestock management problems and resource damage were occurring on the allotment. Problems included grazing before the range forage was ready, heavy, sustained use, and cattle herds concentrating around water sources. These problems contributed to these poor range conditions. In 1952, a letter from the District Ranger to the Forest Supervisor indicated planned adjustments for the allotment due to "poor conditions" and "over utilization" of the range. "The problem with the allotment is one of too early and too heavy grazing, coupled with common use," the District Ranger reported (historical information is available in the project file).

In 1960, the Laketown allotment and Willow Springs and Mill Hollow common use areas were reconfigured to create the Laketown, Strawberry, and Saddle Creek cattle allotments, and the Willow Springs sheep allotment.

In an effort to improve livestock management and range conditions on these allotments, the Garden City and Laketown allotments were combined in 1963 to create the North Rich Cattle allotment, and common use was eliminated from the entire allotment (except near Elk Spring). The permitted numbers were adjusted to 1,072 head of cattle under term grazing permits and 278 head of cattle under private land permits (for a total of 1,350). The grazing season was reduced to 105 days (June 16 to September 30). See Appendix C.

During the early 1960s, the Forest Service conducted intensive range analyses in this region. In 1968, the Randolph Ranger District of the Cache National Forest completed a Multiple Resource Survey Report for the Development and Improvement of the North Rich Cattle Allotment. The purpose of the project was to increase forage production and improve watershed conditions. The report stated that studies had shown a need for a 65% reduction in permitted grazing if present use and management continued. However, constructing many new developments and improvements was proposed. If these projects were implemented, it was estimated that these actions would result in improved vegetation production, soil protection, and livestock management, and these improvements would then support 90% of the permitted grazing.

The report stated that development of the allotment would require both structural and non-structural range improvements. These included constructing about 14 miles of fencing, spraying 800 to 1,300 acres of sagebrush, broadcast seeding of 800 to 1,000

acres, and constructing 80 watering facilities. The proposed fencing would initially be used to provide protection to sprayed and seeded projects, but would also be designed to separate the allotment from adjacent allotments and divide the allotment into three units to implement a rest-rotation grazing system. The report stated that the permitted livestock numbers would be reduced 10% by adjusting the season of use from June 16 - September 30 to June 21 – September 25 (75 days). During the eight-year development period, the permittees would also be required to take 50% non-use of their permitted numbers.

Implementation of the report began in 1969 when the Allotment Management and Development Plan was completed. This plan was amended in 1971 when the Willow Springs allotment was merged with North Rich and the Willow Springs permittees began running cattle instead of sheep. Between 1969 and 1975, about 14 miles of fence were constructed, 1,400 acres of sagebrush were sprayed, 465 acres were seeded, two cattle guards were installed, and 62 stock waters were developed. During this development period, cattle use was decreased by about 53% through reduced numbers and shortened grazing seasons (i.e., 800 to 900 cattle for 75 days). In 1977, implementation of the rest rotation system began and livestock use was restored to 1,329 head of cattle with a grazing season of June 16 to September 30 (105 days). Because of droughty conditions in 1977, 30% non-use was taken during this first year of the rest rotation system (records available in the project file).

The effort to manage livestock with the rest rotation grazing system lasted about 11 years, but eventually failed. Reasons for the failure included lack of fence maintenance due to poor fence location and unfenced gaps. In some cases, fences were constructed into heavy timber and ended without linking to other fences. Trees also fell across fences after maintenance was completed, often breaking wires. Cattle then either stepped across the fences or walked around them. Fences were in such disrepair that in 1988 the Forest Service and the permittees agreed to stop trying to maintain the pasture (interior) fences. Since that time, the grazing management system in the allotment has been season long continuous use. Under this system, no area of the allotment is intentionally rested at any time during the grazing season. According to Holechek at al. (2001), the problem with continuous grazing is that livestock have preferred areas for grazing, generally occurring where water, forage and cover are in close proximity. These areas often receive excessive use, even under light stocking rates, if cattle are not distributed or managed properly. This was the case on the North Rich Allotment as indicated by field notes in the late 1980's and early 1990's.

In a 1993 letter to the North Rich permittees, a decision was made by the Logan District Ranger to reduce use on the allotment by 25%. The rationale for this decision was based on the following factors: much of the suitable range was in poor or very poor condition; cattle had been left on the allotment past the date of proper use during the years 1988 through 1992; livestock utilization was found to be in excess of 80% on riparian areas; and the fact that much of the current grazing capacity had been based on applying a rest rotation grazing system and planned improvements of the 1969 AMP, which had by 1993 "deteriorated to a point where the benefits are no longer there." The 1993 decision letter provided the permittees with the option of a 25% reduction in either animal numbers or in

the length of the grazing season. They selected the shortened season (reduced from 105 to 80 days). The objective of the decision was to focus work on improved livestock management and monitoring, to improve resource conditions.

In 1994, the Allotment Management Plan was revised to implement utilization monitoring and reduce the grazing season by 25% (as indicated by the 1993 decision). Livestock numbers under the 1994 AMP remained at 1,329 head of cattle, but the season of use was changed to 80 consecutive days from June 16 to September 30, and confirmed the grazing system as season long use. No attempt was made to change the grazing system. In 1994, the Hells Hollow riparian fence was constructed "to improve wildlife habitat and ensure proper ecosystem function" on this degraded riparian area, according to a 1994 letter to the Logan District Ranger from Forest resource specialists.

In 1996, all grazing permits were modified to incorporate the utilization standards, ground cover standards, and stubble height requirements that were specified in the Wasatch-Cache National Forest Rangeland Health Final EIS and ROD.

In 2000, with the Snowbasin Land Exchange (transferring private land within the allotment to the Forest Service) permitted livestock numbers on the North Rich Allotment were changed to about 1,260.

In addition to distribution problems the season long continuous grazing system presents, excess and unauthorized use have also been a frequent problem on the allotment (see Sections 3.4.8.2 and 3.4.8.3). Trespass of livestock onto the allotment has occurred before fences were put up in the spring and/or after the authorized grazing season. Trespass generally occurred after calves were born in late winter and livestock were moved to private spring range adjacent to National Forest lands. Removal of all livestock from the allotment by the scheduled off date is difficult because of topography, its large size, and the lack of interior fencing. Prior to 1963, spring and fall trespass by both cattle and horses occurred frequently because a large portion of the National Forest boundary was unfenced.

A band of 700 sheep are allowed to trail through the North Rich Allotment to get to the Swan Peak Sheep Allotment at the beginning of the grazing season (sometime after July 1). They are allowed to trail one day and bed for one night to reach the allotment. The sheep come from Laketown, Utah. They follow a trail route up Richardson Fork to the South Sink, to Middle Sink and then north to the Swan Peak Allotment. They are allowed to bed for one night on the saddle between the Middle and South Sink. In coming off the Swan Peak Allotment (after a 70-day grazing period) they are allowed to trail for one day and bed for one night, following the same trail route back (Middle Sink to South Sink and down Richardson Fork, bedding 1 night on the saddle between Middle and South Sink).

3.4.4 Rangeland Capability, Suitability, and Capable Rangeland Acres

According to the Forest Service, rangeland capability is represented by "the physical attributes or characteristics of the landscape that are conducive to livestock grazing"

(USDA Forest Service 2003). Suitable rangelands are those "that are allocated to grazing use based on decisions related to social, economic, or environmental choices and uses foregone" (USDA Forest Service 2003). The determination of Forest Service lands suitable for grazing on the Logan Ranger District was made in the Revised Forest Plan (USDA Forest Service 2003). According to the Forest Plan, the North Rich allotment is suitable for livestock grazing.

Criteria used to determine capable rangeland acres on the North Rich allotment follow the Revised Forest Plan (USDA Forest Service 2003) and they include: rangelands that produce at least 200 lbs/acre of forage, are one mile or less from available water sources, and occur on slopes less than 30 percent. The cover type (vegetation) map for the allotment was used as the basis to determine the ability to produce 200 lbs/acre. Certain cover types (e.g., non-range (dense) conifer, timber harvest units, and low sagebrush) do not produce this amount of forage and thus were designated as non-capable. Distance to water was determined using geospatial data sets of all water sources (perennial springs, seeps, and streams) and analyzing their distribution using GIS. A GIS analysis process was also used to determine percent slope. Approximately 60 percent of the allotment is capable rangelands, which are distributed throughout the allotment. A map of the capable rangelands within the North Rich allotment is shown in Figure 3.3.

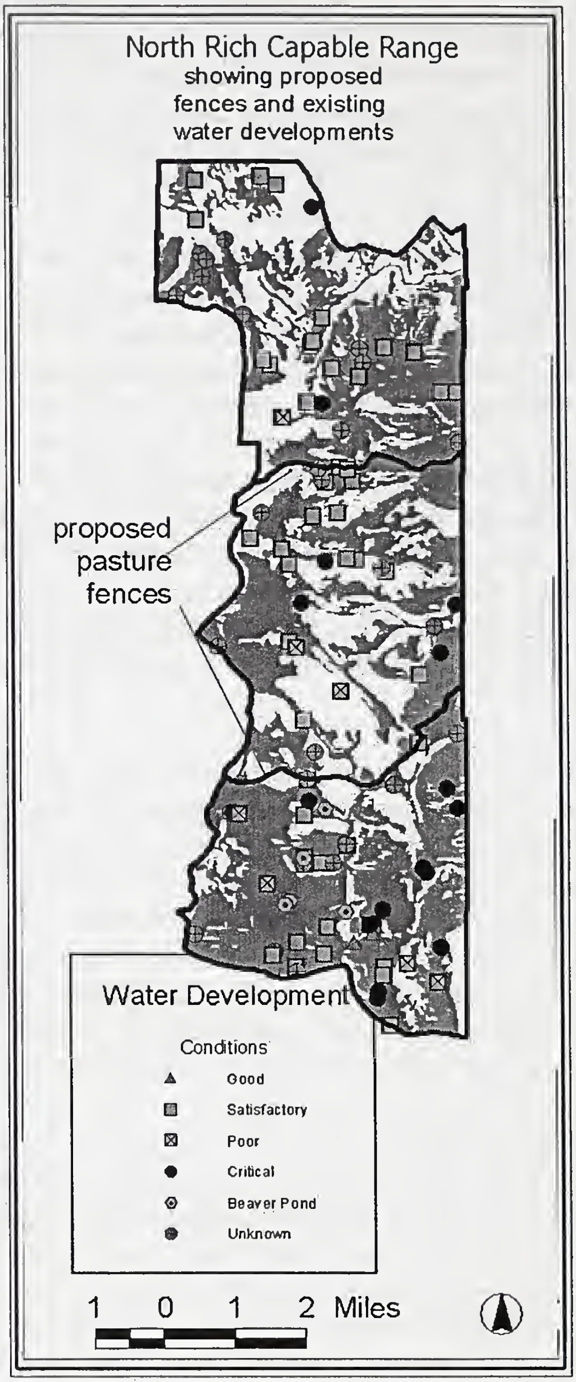


Figure 3.3 Distribution of capable rangeland acres within the North Rich allotment based on distance from water (one mile or less), slopes less than 30 percent, and capability to produce at least 200 lbs/acre of forage.

Table 3.2 illustrates the number of total acres for each cover type within the allotment, the percent of the total acres of each cover type, the total capable acres for each cover type, and the percent of total capable acres for each cover type within the allotment.

Table 3.2 Number of capable acres (rounded to the nearest 5 acres) for each cover type on the North Rich allotment.

Cover Type	Total Acres	Percent of Total Allotment	Capable Acres	Percent of Total Capable Acres	Mean Production Per Acre
Aspen	9,340	34%	8,135	49%	1,103
Aspen-Conifer	1,455	5%	1,335	8%	
Conifer-Aspen	975	4%	960	6%	
Total Aspen	11,770	43%	10,430	63%	
Big Sagebrush	4,680	17%	3,510	21%	426
Low Sagebrush[1]	1,695	6%	0	0%	X
Total Sagebrush	6,375	23%	3,510	21%	
Rangeland Conifer	2,790	10%	2,305	14%	737
Non-range Conifer[1]	4,560	17%	0	0%	X
Harvest Units[1]	1,310	5%	0	0%	X
Mahogany	680	2%	240	1%	382
Mountain Brush	15	0%	5	0%	880
Historical Tall Forb[1]	65	0%	0	0%	X
Total	27,560	100%	16,490	100%	

[1] These are non-capable rangeland cover types, generally producing less than 200 lbs/acre.

3.4.5 Existing Rangeland Conditions

The conditions of rangeland vegetation and soils on the North Rich allotment were determined in the early 1960's using methods identified in the Intermountain Region Range Analysis Handbook (USDA Forest Service 1964). With this method, vegetation condition was based on a combination of species composition and the relationship of production (lbs/acre) for existing species compared to potential production of each site. Rangeland vegetation condition was judged against an "ecological standard or ideal for each range type" and soil condition was determined by the "amount and dispersion of ground cover and the current soil erosion".

As is shown in the 1960's analysis, approximately 37 percent of the rangeland vegetation in the allotment was determined to be in either good or excellent condition. Approximately 49 percent of the rangelands were determined to be in fair condition while about 15 percent was either poor or very poor. While methods have changed since these initial studies were done, range condition is still judged against the potential for each vegetation type.

Between 1998 and 2003, an assessment of rangeland conditions within the North Rich Allotment were determined for nearly 50 percent of the capable rangeland acres within the allotment (rounded to the nearest 100 acres). Capable rangelands make up approximately 60 percent of the total acres within the allotment. Condition was based on ground cover standards in the 2003 Revised Forest Plan (USDA Forest Service 2003), as well as the site-specific desired conditions for plant communities outlined in Chapter 1 of this document. These condition determinations were distributed evenly throughout the allotment as is shown in Figure 3.4.

A determination of ground cover conditions in sagebrush, mountain mahogany, and historical tall forb communities was conducted. In addition, an assessment of seral status of aspen, aspen-conifer, and conifer aspen communities was conducted. Approximately 7 percent of the capable rangeland acres were determined to be in satisfactory condition based on field observations. The Rangeland Conifer Type, which has no established desired conditions for associated understory species composition, occupied 14 percent of the allotment and had high ground cover in stands visited. It is, therefore, also considered to be in satisfactory condition. Approximately 41 percent of the capable rangeland acres were determined to be in unsatisfactory condition. Of these unsatisfactory condition rangelands, about 1,300 acres were unsatisfactory because of both insufficient ground cover and because of seral status (species composition and abundance), 900 acres because of insufficient ground cover, and 4,600 acres because of seral status alone. No determination was made on approximately 38 percent of the capable rangelands in the allotment.

Table 3.3 Current range conditions measured on capable rangelands (approximately 16,500 acres) within the North Rich Allotment.

Current Condition	Acres	Percent of Capable Rangelands
Satisfactory	1,200	7.3%
Unsatisfactory	6,800	41.2%
Rangeland Conifer[1]	2,300	13.9%
Undetermined	6,200	37.6%
Total	16,500	100.0%

[1] No criteria have been established for rangeland conditions in the Rangeland Conifer cover type

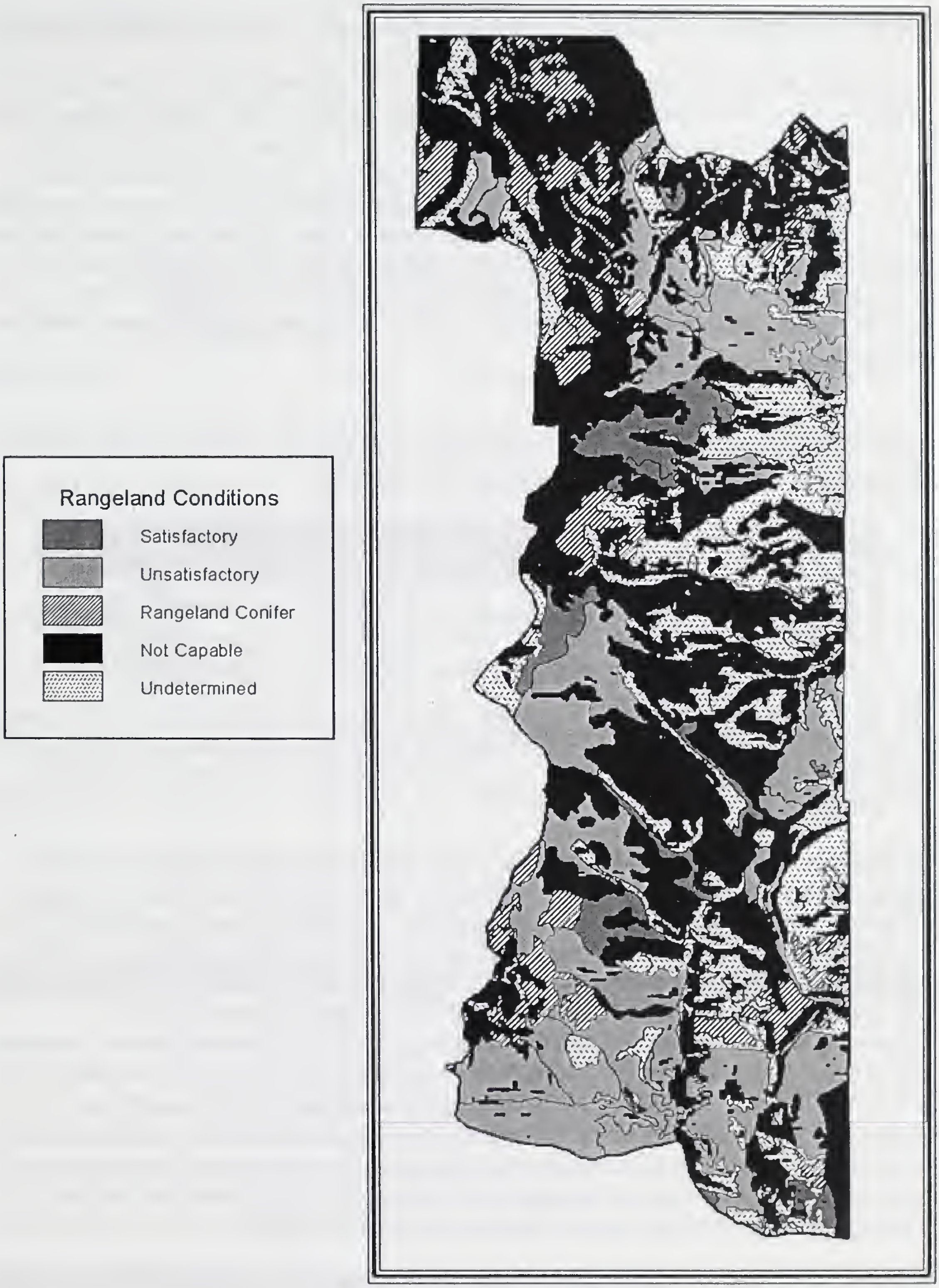


Figure 3.4 Rangeland conditions on the North Rich Allotment as determined by relationship to desired conditions.

3.4.6 Grazing Capacity

One method for determining the grazing capacity of an allotment is to estimate the total forage production available to livestock on capable rangelands and compare that estimate to the amount of forage required for a given number of livestock. The grazing capacity for the North Rich allotment was estimated using known forage production estimates for cover types (based on data collected by the Forest Service in the 1960's – see project file) and the current cover type map. Table 3.4 summarizes these production estimates for the three proposed pastures for two different livestock use levels (35% and 50% use of available forage). These figures are annual estimates of the total amount of forage available during each (annual) grazing season from all capable rangeland acres within the allotment.

Table 3.4 Total annual forage production estimates by pasture and amounts of available forage at two different livestock use levels (35% and 50%).

Pasture	Total Dry Weight per Pasture (lbs)	Available Forage 35% use (lbs)	Available Forage 50% use (lbs)
North	3,315,572	1,160,450	1,657,786
Middle	4,162,162	1,456,757	2,081,081
South	6,812,575	2,384,401	3,406,287

The daily forage requirement for a cow-calf pair (or Animal Unit) is 26 lbs. of dry matter forage (Jensen 1984). The total forage requirement, then, for the permitted cattle on the North Rich allotment for a grazing season is 2,620,800 lbs. (26 x 1260 cattle x 80 days; see next section).

Forage production is estimated to be greatest on the south pasture, followed by the middle pasture, and the least amount available on the north pasture (Table 3.4). If the estimates from the two lowest producing pastures are combined, and a use rate of 35% is applied (which is the utilization rate suggested for unsatisfactory rangeland), then there would be 2,617,207 lbs. available, which is slightly less than the total forage requirement for 1260 head. If a use rate of 50% is applied (the maximum allowable use for rangelands in satisfactory condition), the combined total for these two pastures increases to 3,738,867 lbs., which greatly exceeds the total forage requirement. Given that at least some of the capable rangeland in North Rich is in satisfactory condition and can withstand 50% use, these figures demonstrate the capacity of the North Rich rangelands to sustain the current permitted level of grazing given proper livestock distribution and management. However, proper management has not always been achieved on this allotment during recent history (see Sections 3.4.8.2 and 3.4.8.3).

3.4.7 Current Permitted Grazing

There are currently 8 grazing permits (held by 7 permittees) issued for the allotment and information on these permits is shown in Table 3.5.

In 2000, 1,920 acres of private land associated with a Term Private Land Permit were transferred to the Forest Service through the Snowbasin Land Exchange. Since that time, the Forest Service is administering a State Grazing Permit issued to one of the permittees, authorizing grazing of 104 cattle under this permit.

Table 3.5 Permit information for livestock grazing on the North Rich allotment.

Permit Type	Permitted Numbers	Livestock Kind	Livestock Class	Season of Use	Termination Date
Term Grazing	40	Cattle	Cow/calf	6/16-9/30*	12/31/2005
Term Grazing	75	Cattle	Cow/calf	6/16-9/30*	12/31/2012
Term Grazing	81	Cattle	Cow/calf	6/16-9/30*	12/31/2005
Term Grazing	104	Cattle	Cow/calf	6/16-9/30*	4/30/2008
Term Grazing	143	Cattle	Cow/calf	6/16-9/30*	12/31/2012
Term Grazing	161	Cattle	Cow/calf	6/16-9/30*	12/31/2010
Term Grazing	280	Cattle	Cow/calf	6/16-9/30*	12/31/2012
Term Grazing	376	Cattle	Cow/calf	6/16-9/30*	12/31/2012
Total	1260			* For 80 consecutive days.	

3.4.8 Range Improvements

There are a total of 88 range improvements on the North Rich Allotment. These include 67 ponds, 8 reservoirs, 7 boundary and riparian fences (totaling 10.5 miles), and 6 water troughs (see Figure 3.3, and Appendix D for a listing of improvements with known conditions). The condition of a portion of the improvements is not known. Conditions of the improvements vary from good to critical, with several ponds and fences in need of maintenance. Additionally, about 12 miles of boundary fences (mainly to the west and northwest) are in need of reconstruction as shown in Figure 3.5.

A summary of the functional conditions of the water developments (shown in Figure 3.3) is shown in Table 3.6. Over 60% of the water developments on the North Rich allotment are classified as functional for those improvements where the condition is known. In the proposed north pasture 78% (14/18) of the improvements are functional; in the middle

pasture, 68% (15/22) are functional; and in the south pasture, 44% (11/25) of the improvements are functional.

Maintenance of improvements is included in the terms and conditions of the grazing permit. Permittees and the Forest Service agree upon the improvements to be maintained each year in the annual operating instructions. Ponds need to be cleaned on a regular basis to be functional and help in proper distribution of cattle. If not maintained properly, they no longer store and provide adequate water for livestock. Such is the case with some of the non-functional improvements listed above.

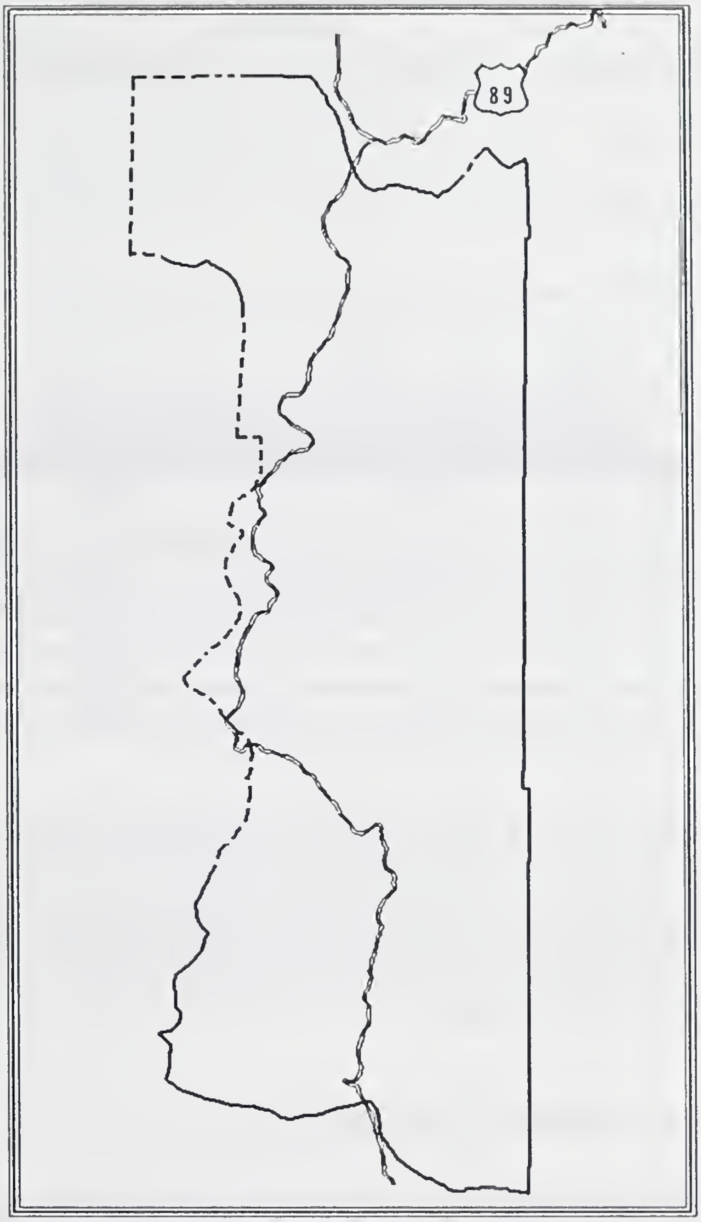


Figure 3.5 The North Rich allotment with the dotted line representing the boundary fences in need of reconstruction.

Table 3.6 The number of water developments by known condition on the North Rich allotment by the proposed pastures (see Figure 3.3).

	Condition	
Pasture	**Functional**	**Non-functional**
North	14	4
Middle	15	7
South	11	14
Totals	40	25

3.4.9 Monitoring

Both long-term trend (of rangeland conditions) and seasonal monitoring studies of livestock use are conducted on the North Rich allotment. Areas within suitable rangelands have been selected to serve as benchmarks and key areas where observations and studies are made. Benchmarks are areas where long-term monitoring occurs and key areas are where seasonal monitoring (measuring livestock use throughout the grazing season) occurs. Both benchmarks and key areas are representative of suitable rangelands and are sensitive to changes in livestock management.

Long-term monitoring is established to identify the condition and trend of representative rangelands on the allotment. The objective of this monitoring is to determine whether or not the rangelands are moving toward the desired conditions. Key areas are selected to conduct monitoring of livestock use within the grazing season and to determine when proper use is reached. These may be located in benchmark areas as well as in additional areas to assess use on a broader basis.

3.4.9.1 Long-Term Rangeland Trend Monitoring

Three long-term trend study sites are within the North Rich allotment. Sites at Peter Sink, South Sink, and Temple Flat have been monitored since 1955. Parker 3-Step monitoring was done through the 1980's, and then nested frequency monitoring was done in 1999 on each of these sites. Both of these monitoring techniques measure ground cover (vegetation, litter, rock > ¾ inch, and mosses) and these data are used to determine change in rangeland/watershed condition over time. The trends in ground cover at these three sites are shown in Table 3.7.

Both sites at Peter Sink and South Sink are dominated by mountain big sagebrush. The Peter Sink site was sprayed in 1969 to reduce sagebrush cover and increase available forage. This area was not seeded following treatment. The reduction in ground cover in

1971 (Table 3.7) is attributed to the loss of all broadleaf plants (shrubs and forbs) following spraying, and a slow recovery of the remaining grasses in the area. Ground cover has continued to increase since that time, but remains lower than the pretreatment level. The South Sink monitoring site was also sprayed in 1969 to increase available forage. This treatment was followed by a dramatic increase in grasses. Today the area is once again dominated by a dense overstory of sagebrush with little herbaceous undergrowth. The Temple Flat monitoring site is a dry meadow that was likely dominated by tufted hairgrass prior to livestock use in the area. Ground cover has increased at the Temple Flat site, but remains below the desired amount for this area.

Table 3.7 Ground cover (%) from three monitoring sites on the North Rich allotment showing trends over 44 years.

Year of Monitoring	Monitoring Site		
	Peter Sink	South Sink	Temple Flat
1955	89	73.5	60
1960	84.5	83	62.7
1965	79	70.5	-
1971	60	-	-
1972	-	73.5	71
1986	-	-	77.3
1999	75.5	70.5	70.7

Two additional long-term trend (nested frequency) monitoring sites were established in North Rich during 2002 to ensure coverage of rangelands in each of the proposed new pastures. These included an aspen site in Slideout Canyon in the proposed middle pasture, and a sagebrush-grassland site near Mill Hollow in the proposed south pasture. A third site was established in an area near the boundary between the North Rich and the Little Bear allotment, west of Jebo Canyon. A summary of the ground cover of these three sites is shown in Table 3.8.

Table 3.8 Ground cover (%) from three additional long-term monitoring sites collected during 2002.

Year of Monitoring	Monitoring Site		
	Slideout	Mill Hollow	N. Rich/Little Bear
2002	67.3	86.5	43.5

A ground cover control site was established on a mountain big sagebrush site outside the allotment on an area similar to those found in the allotment boundary (Figure 3.6). Using the nested frequency method for determining ground cover (USDA Forest Service 1993), potential ground cover for the mountain big sagebrush type was determined to be 86

percent. As stated in Section 1.5.6, desired ground cover condition for mountain big sagebrush is 73% (86% x 0.85).

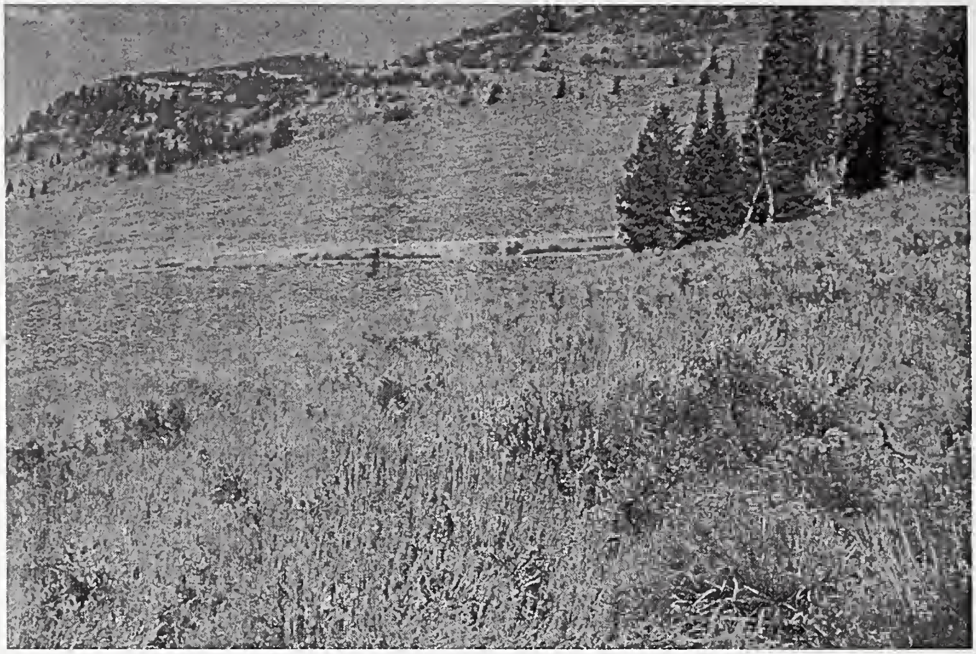


Figure 3.6 Reference mountain big sagebrush site measured (using the nested frequency ground cover method) to determine potential ground cover for similar sites within the allotment. This site is just north of the North Rich allotment in an ungrazed, undisturbed portion of the Forest on the same general landform as areas measured within the allotment.

Willow Creek Ecology (2000) established two control monitoring sites in mountain big sagebrush communities in similar areas near the northern boundary of the allotment. Their sites were measured annually between 1991 and 2000. Estimates of ground cover in the years 1991 through 1999 were made within a 3-ft. diameter hoop placed at 10 points along a 100-meter transect. While these methods cannot be directly compared with those used by the Forest Service, they do provide a general assessment of ground cover conditions. In 2000, Willow Creek Ecology used a different method that was similar to the Forest Service nested frequency method. Instead of a frame with 4 points placed at 5-foot intervals along five 100-foot transects (for a total of 400 points), they used a frame with 8 points in a similar fashion (for a total of 800 points). The Forest Service method measures ground cover as vegetation, litter, moss, and rock (> ¾ inch diameter), and bare ground as soil and pavement (or rock < ¾ inch). The Forest Service assumes that rocks less than ¾ inch diameter do not protect the soil surface for the erosive actions of raindrop impacts. Willow Creek Ecology measured rock, "crust", grass, litter, forb, shrub, and bare ground; we assume that they did not separate rock into two distinct categories.

Using the method closest to our nested frequency ground cover method, the Willow Creek Ecology Middle Sinks and their Sinks Road control sites were measured at approximately 95 percent ground cover. These numbers are higher than those we sampled at a nearby site using the nested frequency ground cover method. Because of differences in methods and the indicators of ground cover used by Willow Creek Ecology, we have used the ground cover value from our control site (86 percent) to establish desired conditions on mountain big sagebrush communities in this allotment.

Willow Creek Ecology (2000) also measured a mountain big sagebrush site in the North Rich allotment near the Hodges Trail. This site averaged 50 percent ground cover and ranged from 29 to 68 percent over the 8-year monitoring period. This value is consistent with our measured ground cover at nearby locations. Their Richardson Trail site is discussed in the vegetation section of Chapter 3 under the Historical Tall Forb Cover Type. Willow Creek Ecology lists several other monitoring sites (Hardware Ranch Control, Peter Sinks Road Logged and Grazed, Upper Spawn Creek Logged and Grazed, Temple Mountain Grazed, and Saddle Creek Road Grazed) as being in the North Rich allotment, but these all occur on adjacent allotments.

3.4.9.2 Seasonal Monitoring

Prior to 1990, utilization monitoring of livestock use on the North Rich allotment was conducted on uplands. The objective of this monitoring was to determine when proper use was achieved, and when livestock should be moved within or removed from the allotment. From 1990 to the present, monitoring of livestock use shifted from the uplands to conducting sampling and observations along riparian areas. Reasons for this shift in focus included recent research. Gillen et al. (1984) noted that under continuous and deferred-rotation grazing systems, small riparian meadows were the most preferred livestock use areas. They also noted that riparian communities were a major factor influencing livestock grazing distribution. In another study of forested rangelands, Roath and Krueger (1982a) also reported on livestock preference for riparian areas. They found that a riparian zone comprised just 1.9% of an allotment but produced 21% of available forage and 81% of forage consumed. These patterns of livestock use and preference were observed in the North Rich allotment and, consequently, the appropriate locations for monitoring livestock use were shifted to riparian areas.

Examples of mid and late-season monitoring data of livestock use that were collected on the North Rich allotment are shown in Table 3.9 (see project file for additional data). Methods used to collect these data include ocular estimates of use of key plant species using a utilization gauge (developed by the Forest Service, Rocky Mountain Forest and Range Experiment Station), and measurements of stubble height (residual plants) of key species in riparian areas. In general, the Forest standard for stubble height is 4 to 6 inches (USDA Forest Service 2003).

Table 3.9 Livestock off-dates and a sample of livestock use monitoring data (and dates measured) from 4 sites on the North Rich allotment during 1992 to 2003. Data are presented as percent utilization or stubble height (in inches).

Year	Off-Date	Monitoring Site							
		Bear Wallow	Date Measured	Cheney Creek	Date Measured	Mill Hollow	Date Measured	South Sinks	Date Measured
1992	8/28	85%	8/4	81%	8/11	63%	8/6	61%	8/11
1993	9/30	3.8"	10/21	3.9"	11/2	4.9"	9/24		
1994	8/16	75%	7/13	85%	7/13	75%	7/13	80%	7/13
1995	9/16	4.0"	10/10	4.4"	10/10	5.4"	10/10		
1996	9/13	2.8"	9/26	3.8"	9/26	4.2"	9/26		
1997	9/02	4.9"	7/24	7.1"	7/24	11.6"	7/14		
1998	9/20	6.4"	7/30	9.1"	7/30	6.6"	7/30		
2002	9/03							54%	8/30
2003	9/07							53%	9/10

The data in Table 3.9 show that actual utilization of forage measured at key areas is variable. Factors influencing this variability include the degree of livestock use at a given site and the date use measurements are taken. During 1992 to 1994, the data show that utilization standards were consistently exceeded in these key areas. In 1995, end of season measurements show that forage utilization met the 4- to 5-inch stubble height requirement. In 1996, two of the three key areas listed in Table 3.9 exceeded the standard while one was within the required stubble height range. It is difficult to determine whether standards have been exceeded when measurements are made well before the actual date livestock were removed from the allotment (such as in 1997 and 1998 when data were collected about 40 and 50 days, respectively, prior to cattle going off). No conclusions can be drawn about whether or not standards were met or exceeded from the available data in these years.

3.4.9.3 Compliance Monitoring

As discussed under Grazing History (section 3.4.3), issues with keeping livestock in the desired locations and within the scheduled grazing period have been common in recent history. Records show that during recent history, livestock have repeatedly entered the allotment prior to the authorized on-date, stayed on the allotment after the required off-date, and have been found grazing outside the allotment or within adjacent allotments and within areas that were to be rested (Table 3.10). The difficulty of controlling livestock is increased by the lack and disrepair of fences as described under Range Improvements (section 3.4.8). In addition, the complexity of livestock management on the North Rich allotment is compounded by the rough topography and the time required for the permittees or herders to reach particular areas within the allotment. To correct problems of cattle that are observed in noncompliance, the permittees or herders are notified and then must make arrangements to go out to the allotment to find and relocate the livestock. This is a difficult and time-consuming process because cattle often move to another location by the time the permittee or herder arrives in the area where they were initially sighted.

Table 3.10 Types of noncompliance documented occurring on the North Rich allotment during 1990 to 1999. X represents one or more occurrence in records.

Year: / Type of Noncompliance	1990	91	92	93	94	95	96	97	98	1999
Cattle in rested area	X		X				X	X		
Cattle on allotment early									X	X
Cattle stay on allotment late	X	X	X				X			
Cattle trespass (adjacent lands)		X		X		X	X	X	X	
Cattle in area after utilization met	X		X		X					

The frequent occurrences of noncompliance shown in Table 310 highlight the importance of fence and water development maintenance, as well as salting and herding, in order to maintain desired livestock distribution. In addition, the challenge of keeping forage utilization within prescribed limits in areas favored by livestock such as riparian is apparent.

3.5 Recreation, Roads and Trails

The purpose of this section is to explain and clarify the existing recreation opportunities and experiences provided within the area of the North Rich Allotment that could be affected by the proposed action or any of the alternatives.

3.5.1 Area of Influence

For direct effects of livestock grazing the area of influence is the boundary of the grazing allotment. For indirect effects the area of influence extends from the south at Hardware Ranch up Sinks Road to the Logan Canyon Scenic Byway. It would include access points at Beaver Junction, where the road to Beaver Mountain meets Highway 89, USU Forestry Camp dispersed recreation area, and the Spawn Creek Trailhead in Temple Fork.

3.5.2 Existing Conditions

The three predominate seasons of recreation use within the area of the North Rich Allotment are summer, fall and winter. There are no developed recreation facilities in the allotment. There are, however, three developed recreation facilities adjacent to the northern allotment boundary: Sunrise Campground, Limber Pine Nature Trail, and the Sinks winter parking area.

The Revised Forest Plan reports that recreation use on the Wasatch-Cache National Forest is increasing (USDA Forest Service 2003). Of particular concern to recreation managers is the increase in visitation from the Bear Lake/Rich County areas. Authorized access points to and through the east side of the district are limited and user created trails and their associated impacts are thought to be increasing.

Summer Recreation. Summer use generally starts in late June to early July as the high elevation snowpack melts. As temperatures at the lower elevation increase and dry conditions prevail, campers tend to move up to the shaded areas accessed by the Sinks Road (FR 055), also designated the Hardware Ranch Scenic Backway (Utah 242). Dispersed recreation camping is the dominant activity along with Off Highway Vehicle (OHV) riding, driving for pleasure, and horseback riding. Hiking and biking also occur but at lower use levels.

Campsites are generally accessed by motor vehicle and consist of mostly vehicle camping with some associated tents. A dispersed recreation campsite inventory was conducted on the Logan Ranger District in the summer of 1997 (Figure 3.7). At that time, ninety-eight campsites were inventoried in the North Rich Allotment. The majority of inventoried campsites are along the Sinks Road. There are clusters of campsites at the Sinks Road/Peter Sinks Road (FR 173) junction with additional concentrations south along the Sinks Road to the junction with the Slideout Canyon Road. Additional campsite concentrations are found at the head of the Spawn Creek drainage and in the Temple Flat area. Seventy-nine of the ninety-eight campsites inventoried are found within coniferous plant communities, adding to the supposition that the shade and the cooler temperatures

are part of what attract people to this area in the summer. Three sites were identified as being located in a riparian plant community. Fourteen sites were identified as needing some level of rehabilitation, while none of the sites were identified as needing to be closed.

Fall Recreation. Fall (generally September through October) is the hunting season and the Sinks Road accesses some of the high elevation big game hunting areas. At this time, recreation is dominated by camper/hunters, most with OHV's or four wheel drive vehicles, and a lesser number hiking or with horses. During this time, illegal OHV use increases with many decommissioned routes, cow trails, routes to springs, or ridgelines being illegally ridden by hunters.

Winter Recreation. The winter season (December 15 through March 15) is dominated by winter sports use. Snowmobiling is by far the most popular activity in the North Rich Allotment vicinity. The State of Utah Division of Parks and Recreation, through a Memorandum of Understanding (MOU), grooms an extensive and very popular snowmobile trail system on and around the Sinks Road alignment. Most visitor access is from the junction of the Sinks Road with Highway 89, the Sinks winter parking lot, or the parking area in front of the State Highway sheds just west of Swan Flat Road. Additional visitors access the area from Beaver Creek Lodge where Forest Service-permitted snowmobile rental and guiding services are available. Visitors also access the area from the snowmobile parking lots at Hardware Ranch. Family snowplay on sleds and innertubes is very popular at the Sinks winter parking area, just north of the allotment boundary.

Recreation Opportunity Spectrum (ROS). Allocations for general types of recreation or recreation activities are inventoried, categorized, and mapped by a system called the Recreation Opportunity Spectrum (ROS). The ROS as used in the Wasatch-Cache Final Environmental Impact Statement (FEIS) (USDA Forest Service 2003) has eight categories. These categories range along a scale from "Wilderness/Primitive" which is the most remote, least developed, with the least evidence of human impact to "Urban" which is the least remote, most highly developed and has the most evidence of human use. There are three classes of ROS found in the North Rich Allotment area (Figure3.7): Roaded Natural (RN) (7,884 acres), mostly adjacent to the designated-open roads, Semi-primitive Motorized (SPM) (9,221 acres) associated with the designated ATV trails, and Semi-primitive Non-motorized (SPNM) (7,578 acres).

Scenery Management System. The visual or scenic qualities of an area are inventoried, categorized, and mapped by a system called the Scenery Management System. This system assigns one of six "landscape character themes" to selected areas. Each theme is further assigned a "scenic integrity" level ranging from low to high. There are two SMS themes found in the North Rich area. There are about 60 acres inventoried as Developed Natural Appearing of High Concern along the Logan Canyon Scenic Byway. About 24,630 acres are inventoried as Natural Appearing with either High or Moderate concern levels. For further details concerning ROS and SMS, see Appendix D of the Revised Forest Plan FEIS.

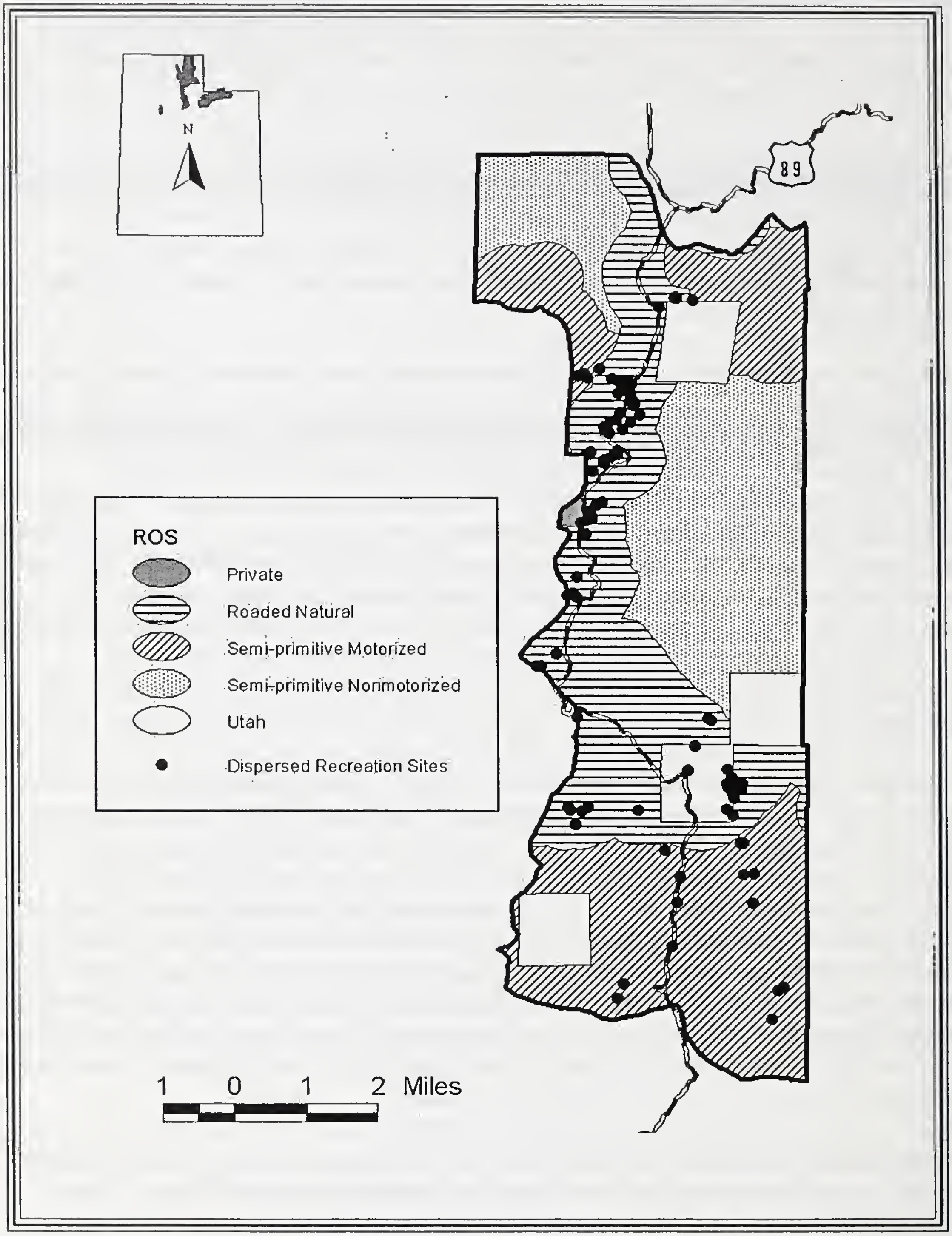


Figure 3.7 Recreation Opportunity Classes and Dispersed Campsite Locations

Travel Plan Management. Access to public lands is an important issue to visitors. The Forest Service establishes appropriate motorized and non-motorized travel routes through a travel planning process. This site-specific process looks at public and administrative needs for accessing areas and develops a plan (generally presented as a map) that balances those needs with concerns about impacts to biophysical or social resources. Current access to the North Rich Allotment is managed as shown on the "Travel Map Wasatch-Cache National Forest Ogden and Logan Ranger Districts 1997" (available in the project file). This map designates open routes for motorized over-land travel on roads or trails as well as areas or routes open to over-snow travel. All over-land motorized travel on the district is confined to routes marked as designated-open on the travel map. Winter motorized opportunities are shown as open areas. All of the allotment is open to over-snow machines except a portion from Hodges Canyon north to the Logan Canyon Scenic Byway which has been closed to provide skier opportunities.

The travel management system currently in place was largely developed in 1988 and refined in 1991 through a series of public meetings and working groups. At that time many routes were proposed for closure and decommissioning. Some of these routes were probably created to construct fence lines, develop ponds for watering animals, and for harvesting timber or fighting fires. Due to the increase in the use of OHV's and advances in their technologies many of the old road grades or scars are being reopened illegally. Some are reopened for recreational riders, but the majority receives their use during the hunting season when hunters try to access the ridges and many of the developed and undeveloped water sources or go in for game retrieval.

Over-Land Travel. Spring, summer, and fall travel constrains motorized use to roads or trails designated as open for motorized use (Figure 3.8). The majority of the allowed motorized use in this area is on Forest system roads. The Sinks Road is the main travel route through the area. Visitors use these roads for driving for pleasure, to seek out dispersed recreation campsites, for access to hunting locations, and in the fall for hauling fuel wood. From the Bear Lake Valley the eastern portion of the allotment is accessed by Temple Canyon Road, which crosses the allotment and meets Highway 89 at Temple Fork. In addition to the roads system, there are also opportunities for OHV use on motorized trails (Figure 3.8).

Over-Snow Travel. Snowmobiling is the dominant use in the analysis area during the winter months. There are approximately 30 miles of groomed snowmobile trails and the entire area is open to over-snow travel when there is an adequate snow base. Some skiing does occur, mostly family outings on the Sinks Road, and there is some ski and snowshoe use in the Amazon Hollow/Stump Hollow/Horse Lake areas. The Sinks winter parking area, just north of the allotment boundary is the most heavily used winter trailhead on the district. The majority of use from here goes south towards the Hardware Ranch, north out of the allotment area, or enjoys tubing, and sledding on hills adjacent to the parking area.

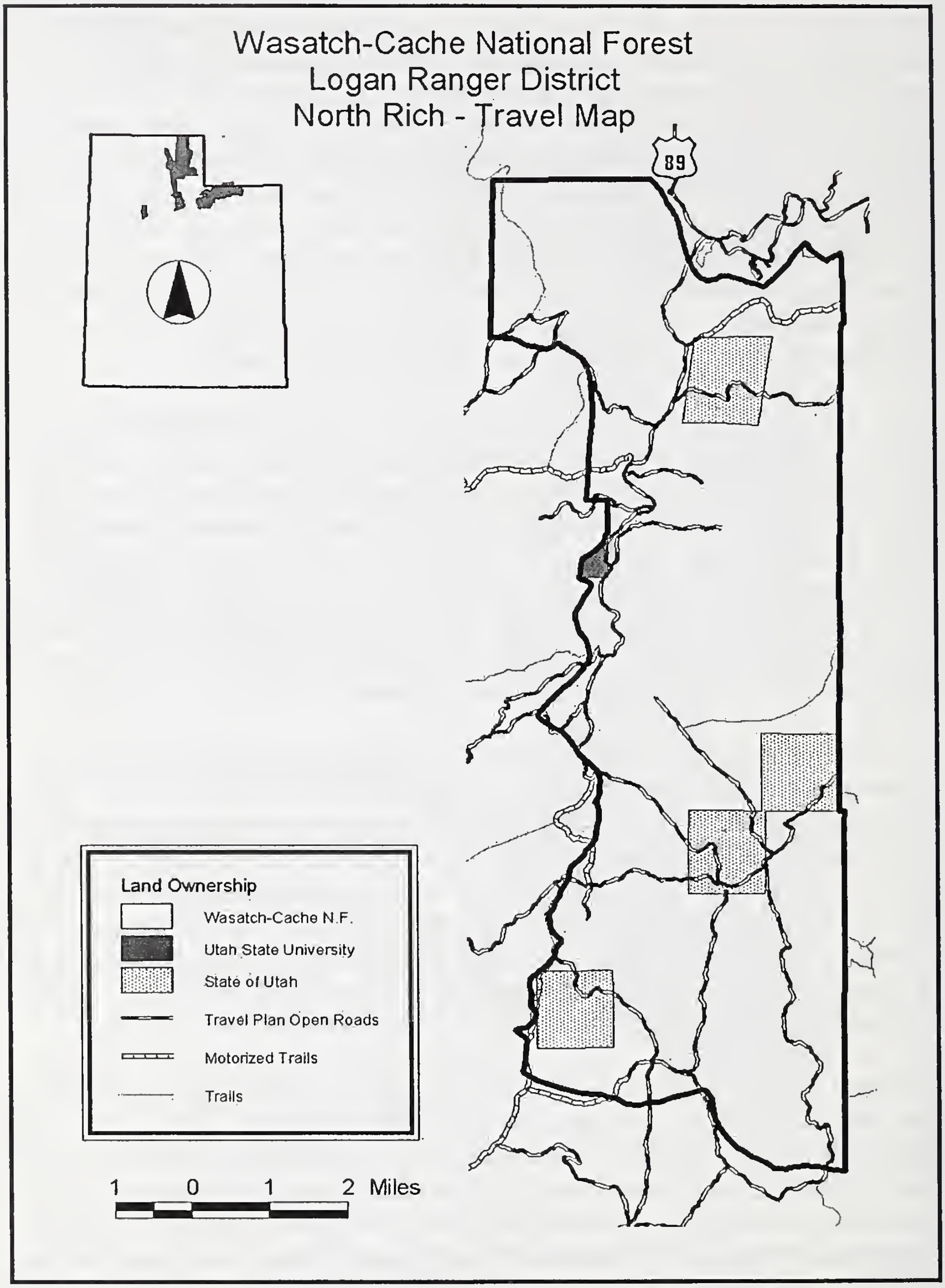


Figure 3.8 Designated-Open Travel Management Routes within the North Rich Allotment

3.6 Socioeconomics

The purpose of this section is to explain and clarify the existing social and economic condition associated with this allotment and the land area that it occupies.

3.6.1 Area of Influence

The primary area of influence is Rich County because all but one of the permittees running livestock on the North Rich Allotment live in that county.

3.6.2 Existing Conditions

3.6.2.1 Society and Economy

Much of the existing information available for this analysis is organized using the county as the basic unit of consideration. Consequently, many of the statements about society and economy in this document center on Rich County. In addition to this general broad scale information from existing sources, telephone interviews were conducted with each North Rich Allotment permittee in December 2001 and January 2002 to establish some specific information regarding the individuals and families and their relationships to this allotment. Other parts of this document on the archeology and history of the area (see Heritage Resources, Section 3.3) may also be of interest to readers who want to know more about how human uses in the area have developed over time.

Rich County is a rural area with a small population. Most people live in the small towns of Woodruff and Randolph (county seat) to the south or near the shores of Bear Lake in Laketown or Garden City in the northern part of the county. Seasonal occupation of recreation homes and condominiums in the Bear Lake area increases the population during the summer for boating, in fall for hunting, and in winter as people who have a primary residence elsewhere come to snowmobile, ice fish or ski. All but one of the individuals (or families) who have permits to graze livestock on the North Rich Allotment have addresses in the Laketown area. One has a Garland, Utah address.

Population. In the year 2000, Rich County's population was 1,955 (www.governor.state.ut.us/dea, 2001). Population density for the county is about 1 person per square mile. While the population has fluctuated some over the past two decades, it has never been much over 2000, and the projection for the year 2030 is 2131 people (www.qget.state.ut.us/projections, 2001). Overall numbers have been about the same for a long time, with births, deaths, and out migration balancing (www.qget.state.ut.us/programs/tabledata, 2001). Thus, relatively small growth is anticipated using the assumptions that the Utah Governor's Office employed. It is possible, however, that the attractiveness of the Bear Lake area and other different social and economic pressures could increase residential seasonal or year-round occupation in the area beyond these conservative estimates. Thirty-six people are closely associated with the North Rich Allotment as permit holders, wage-earners or fully to partially dependent family members.

Local Economy. Since all but one of the North Rich Allotment permit holders live in Rich County, it is used as the basis for the socioeconomic analysis. Traditionally, Rich County has been supported by agriculture (Parson 1996). In addition, the county has the normal supports of local government and schools and a few small businesses often related to local recreation and tourism around Bear Lake. Based on a review of 1998 IMPLAN data, agriculture and livestock grazing account for 29% of the jobs in Rich County. Services, Trade, and Government sectors each also account for more than 10% of the county's economy (Table 3.11 and Figure 3.9). Most new construction over the last decade has been near Bear Lake, where year round and seasonal residential housing growth has occurred.

Industry outputs from cattle grazing were calculated to be worth $25,620,000 in Rich County in 1998 (Table 3.11), accounting for 39% of all industry outputs in the county. This makes livestock grazing a very important component of the Rich County economy. The Services sector is large in Rich County, but does not produce products for sale that bring new money so directly into the county and to its residents, nor that have as high multiplier values as cattle grazing.

According to State of Utah statistics, Rich County had 55,000 cattle and calves in inventory on January 1, 2000 (2000 Utah Agricultural Statistics, p 82). The 1,263 cow/calf pairs allowed on the North Rich Allotment would then account for about 2% of the county total. Using $86.40 (the average price paid in 1999 prices paid per 100 lb. calves), an average weight of 500 lbs. per calf and complete calf production for the 1260 head allowed on the allotment, a high estimate of the total sales of calves from the North Rich Allotment can be made.

Price/100 lbs	Average Calf Weight in 100's	Full Calf Production on North Rich	High Estimate Sale Value
$86.40	X 5	X 1260	= $544,320

Using $25,620,000 cited above as the value of the industry output for cattle grazing in Rich County in1998, the calculated high estimate sale value of $544,320 seems to be about 2% of the total Rich County industry outputs, coinciding well with the percentage of cattle in the county.

Given the statistics and calculations presented here, the North Rich Allotment and its outputs account for about 2% of the total value of the cattle industry in Rich County.

Social. The North Rich Allotment is comprised of seven permit holders. The permittees' families each consist of a married couple, most of who have dependent children living in the household, or at least close by. In some cases the elderly parents of the permittees are also on the same property or nearby. Thirty-six people are fully or partly dependent on the livestock operations related to the North Rich allotment. The number of individuals who rely fully or partially for support from these businesses ranges from two people to nine. The ages of individuals who are in part dependent on North Rich permits range from infants to elderly retirees. Of these 36 people closely associated with the North Rich Allotment, ten individuals receive full-time employment from work on the ranches associated with North Rich permits or it is their sole source of income. The remaining other adults among these 36 have either part-time or full time employment at jobs that are not related to the ranches and permits. Permittees with smaller landholdings and fewer cattle on their Forest Service permits generally have full or part-

time employment outside their ranching interests, while larger landowners with more head permitted on the North Rich Allotment are employed full-time in the livestock business.

Table 3.11 Rich County – Industry Outputs, Employment and Total Value (1998 IMPLAN Data)

Industry	Industry Output*	Employment	Employee Compensation*	Proprietor Income*	Other Property Income*	Indirect Business Tax*	Total Value Added*
Other Agriculture	2.93	81.51	0.64	0.15	0.27	0.05	1.11
Livestock Grazing	25.62	214.29	1.02	1.28	1.11	0.43	3.84
Mining	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Construction	7.19	80.80	1.09	0.62	0.18	0.04	1.93
Manufacturing	0.87	6.75	0.09	0.00	0.04	0.01	0.14
TCPU	1.69	12.40	0.35	0.12	0.50	0.11	1.07
Trade	3.43	138.90	1.21	0.26	0.49	0.46	2.41
FIRE	6.71	59.40	0.29	0.60	3.13	0.74	4.76
Services	8.92	261.10	4.57	1.02	0.70	0.23	6.52
Government	8.83	168.10	5.13	0.00	0.65	0.00	5.78
Other	0.24	0.00	0.00	0.00	0.24	0.00	0.24
Totals	66.44	1,023.25	14.40	4.05	7.30	2.07	27.82

*Millions of dollars

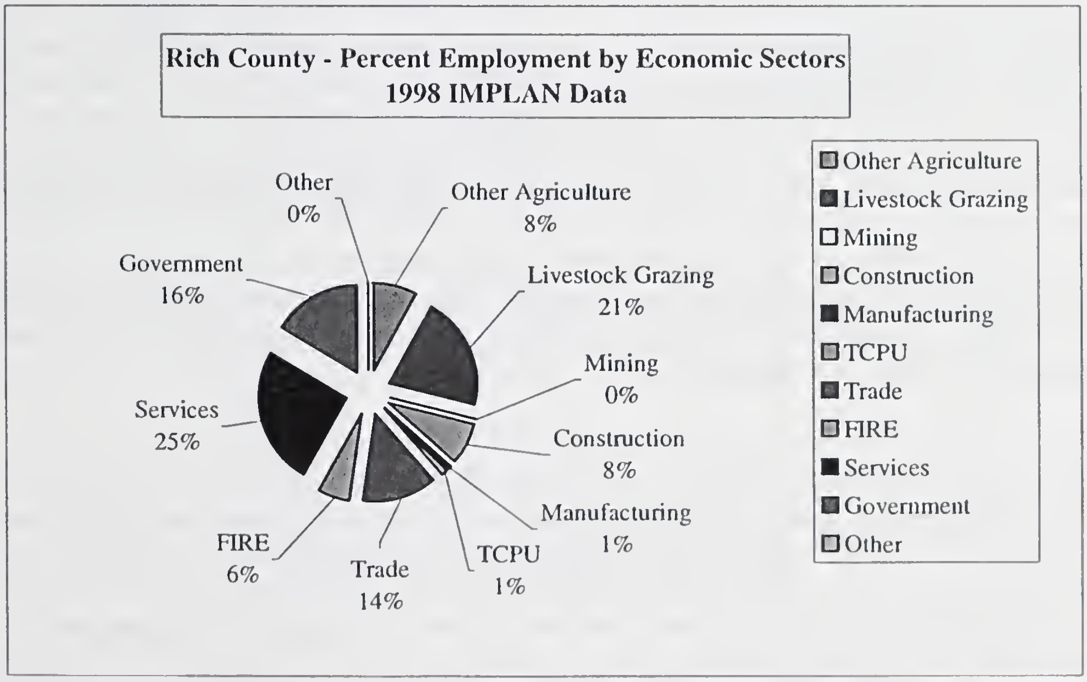


Figure 3.9 Rich County Employment by category

Permittees with larger operations and more head of cattle have a larger stake in their permit to use the forest for grazing. At the same time, since these larger permittees have more assets, they sometimes have more flexibility both operationally and financially than the smaller operators in adjusting to potential changes in their permit or changing economic circumstances than the smaller operators. Smaller operators are more dependent on wages or salaries earned at part-time or full time employment outside livestock grazing than are the larger permittees.

North Rich Allotment livestock businesses and their operation. Each of the seven North Rich permittees is in the livestock business, but the difference in the scale of these operations is substantial. The seven permit holders may run up to 1260 head of cattle. The largest permit on the allotment is for 376 cattle and the smallest is for 40.

While the range of the sizes of these operations is broad, all may still be considered small businesses based on the amount of sales and income and numbers of employees. These small businesses operate with very flexible opportunistic management given the basic constraints that the livestock business imposes. That is, individual permittees will adjust their herd numbers, purchases or sales of animals and feed, sell land for profit, seek outside employment, hire or reduce employees, reduce costs, purchase equipment, put off or entertain new capital investments or make other adjustments very quickly to adapt to market conditions or good or poor environmental/range situations (Chapman et al. 1997).

Income for these cow-calf operations is earned from the sale of calves that are bred a year earlier. Calves are sold by the pound; the bigger the calf - the more it is worth. The sold calves are taken to feed lots and fattened for the market. Costs are based on getting the calf larger and sustaining the cow. In dry years, when feed grows slowly (as in the last two drought years) cattle cost more to raise or sustain as feed is scarce or, when purchased, is expensive. The amount of the allotment forage and the length of time that permittees can keep their cattle on the national forest is a critical factor in how well a business will do from year to year. In dry years permittees may have to take their cattle off early, which means they are smaller and of less value. This is not good for business. Supplemental feeding on private lands or purchase of supplemental feed to increase calf sizes is undesirable. Other costs related to the allotment are for a rider to manage the herds and for fence maintenance.

The North Rich permittees hire a rider who herds and moves cattle during the time when the animals are on the allotment. Permittees spend a lot of time assisting the rider during the summer, with full-time livestock operators doing more of this work than the smaller operators who have other wage/salary jobs. Usually the wives of permittees share a lot of the ranch and herding work, and their labors are integral to the success of the business. The costs of the herding and fencing done on the allotment that is required to meet the terms of the permits and the allotment plan are shared on a prorated basis among the grazing association members based on the number of head a permittee has.

All seven North Rich Allotment permittees also own private lands used for grazing livestock. Three of the permittees have lands that are immediately adjacent to the national forest. These

private landholdings range from about 8000 acres to about 300 hundred acres. Most of these acres are grazed by the same livestock that use the North Rich Allotment or produce hay or alfalfa for feed and grazing. Permittees whose land is immediately adjacent to the Forest simply let down their fences to put their cattle on the allotment; the other three permittees must trail or truck their cattle onto the allotment. These costs of trucking or trailing are not substantial as even the non-adjacent permittees' lands are close to the allotment.

Each of the permittees indicated that their Forest Service permit is integral and very important to their business. The location of cattle on the allotment during summer months allows feed to grow on the permittees' private lands that is used later in the year. Without the use of forage from the permit, permittees would not be able to have as many head of cattle or could not raise them to an economical size. In either case, the permittees' operations and income would be cut substantially.

The net earnings or profit generated from grazing on the allotment is difficult to assess because of the variation in and lack of specific personal data (e.g. cost of labor, land, capital, interest rates, weaning rates, feed costs, marketing strategies, operation efficiency, etc.) regarding the operations of the North Rich Allotment permit holders. Exact financial information for the seven permit holders is not public information.

3.6.2.2 Revenues and Costs to the Federal Government

For Fiscal Year 2002 (Oct 1, 2001 to Sept 30, 2002), the gross receipts collected from the grazing allotments in Rich County totaled $4,796.88. Of this total, $2,398.44 (50% of the gross) was sent to the National Treasury and reallocated to the Forest Service as Range Betterment Funds. The other 50% of the funds are calculated as part of annual payments to the counties. In 2002, Rich County received $8,551 from the Forest Service. That dollar amount accounts for portions of receipts from timber sales, recreation, rent, grazing, power, and campground receipts collected from the Wasatch-Cache National Forest lands.

For Fiscal Year 2003 (Oct 1, 2002 to Sept 30, 2003), the Logan Ranger District received $83,177.24 to administer the range program. This amount includes salary, vehicle, and animal equipment costs. This does not include monies for structural and non-structural range improvements, for administration of other resources that occur within the project area, or for environmental analyses on grazing allotments.

There are more than 80 range improvements (mostly water-related) on the North Rich Allotment. The Range Management section of this chapter briefly describes these improvements, and Appendix D provides a complete list of them with known conditions.

3.6.2.3 Lifestyles and Traditions

Of the eleven counties in which the Wasatch-Cache National Forest has lands, Rich County is the most dependent on agricultural production. Although the recreation business in Rich County (primarily around Bear Lake) has grown significantly in over the past 30 years, the county is still heavily dependent (over 1/4 of employment – see Table 3.11) on grazing and other agriculture

related businesses. Bear Lake is attractive to many people for second or summer homes as well as retirement areas. Many of the long-time residents would like to preserve the simple, rural atmosphere of Rich County and its agricultural industry even as they search for other businesses to invest in Rich County.

Natural resource concerns surrounding commodity-driven businesses (i.e., timber harvesting and livestock grazing) have captured the attention of many environmental groups throughout the country and the activities performed on the Logan Ranger District are no exception. The real and perceived natural resource problems caused by these industries have become a focus for Wasatch-Cache National Forest managers. Livestock grazing in particular has become a highly controversial subject for the Logan Ranger District management.

Livestock grazing in Rich County is at least partially dependent on access to public grazing lands including those managed by the State of Utah, Bureau of Land Management, and Wasatch-Cache National Forest. Permit holders recognize that management changes need to be made on their allotments in response to natural resource problems such as overgrazing, erosion, soil compaction, vegetation loss, and effects on native species. Although permit holders would like to make changes that are less politically sensitive and believe "what is good for the land is good for the cow", they feel their permit privileges are being sacrificed to the pressures of environmental groups (Muir 1992; interviews in 2001 with North Rich permittees – see project file).

Permit holders are very aware of identified areas of poor resource conditions and would like to do some type of management to improve the conditions. They do not understand why the environmental groups that oppose livestock grazing do not appreciate the rancher and his/her large land ownership as the next defense of wildlife and plant habitats. In the event that permit holders cannot maintain their lifestyle (i.e., make a profit), then one clear option is to get out of the cattle business, subdivide, and sell portions if not all of their property. Some permit holders' land already is approved for subdivision (Muir 1992; interviews in 2001 with North Rich permittees – see project file).

Many permit holders are struggling to maintain their traditional lifestyle, a lifestyle that reflects many personal and financial investments. They also have deep emotional and sentimental ties to the grazing business since many of the permit holders have been life-long residents of Rich County, and the grazing privileges have been handed down through the family or from other local residents. Many permit holders want to preserve their rural way of life; they desire being able to drive the cattle out on the range in the summer and herd them in the fall. This has been a family tradition throughout much of the American West, as well as Rich County, and it is a tradition and a heritage in which the permit holders have a great deal of pride and satisfaction. In most cases, permittees on the North Rich Allotment are planning for their children to continue in the livestock business if at all possible.

3.7 Vegetation

The purpose of this section is to explain and clarify the existing vegetation conditions within this allotment.

3.7.1 Area of Influence

For direct and indirect effects of livestock grazing, the area of influence is the North Rich Allotment. For cumulative effects, the area of influence is the northern portion of the Bear River Range within the Wasatch-Cache National Forest.

3.7.2 Existing Conditions

3.7.2.1 Vegetation Cover Types

Plant communities on North Rich Allotment were mapped using the Range Analysis and Inventory polygons drawn in 1962 with minor adjustments based on refinements of those cover types and minor modifications in the allotment boundary since that time. For this analysis, the 1962 Broadleaf Tree type was separated into the Aspen, Aspen-Conifer, and Conifer-Aspen types based on the presence or absence of aspen with and without conifers in each stand, which was estimated based on current aerial photographs. The Aspen-Conifer type has less than 50 percent and more than 15 percent conifer cover in the overstory, while the Conifer-Aspen type has more than 50 percent conifer cover in the overstory. The delineation of timber harvest units has been made to indicate where seral conditions have been altered in the Rangeland Conifer and Non-range Conifer types. In addition, the Sagebrush type was separated into the Big Sagebrush and Low Sagebrush types. Figure 3.10 shows the distribution of the different vegetation cover types within the North Rich Allotment and Table 3.6 lists those cover types and their associated acreage and percent of each type within the total allotment. These cover types are described in detail below.

Vigor of plant communities can vary from year to year based on precipitation. Appendix G shows precipitation amounts and averages from areas nearby the North Rich allotment. In general, each of these monitoring sites have as many years with less than average precipitation as they have years with above average precipitation. While vigor can vary, ground cover and species composition vary less as a result of below-average precipitation.

The methods used to assess current conditions, as noted in Section 3.4 of this document, were based on whether the plant communities are meeting or moving toward desired conditions (satisfactory condition), or are not meeting and not moving toward desired conditions (unsatisfactory condition). Desired conditions, described in detail in Chapter 1, include having desired perennial species dominating vegetation communities and/or having at least 85 percent of the potential ground cover that can occur in each of the different cover types.

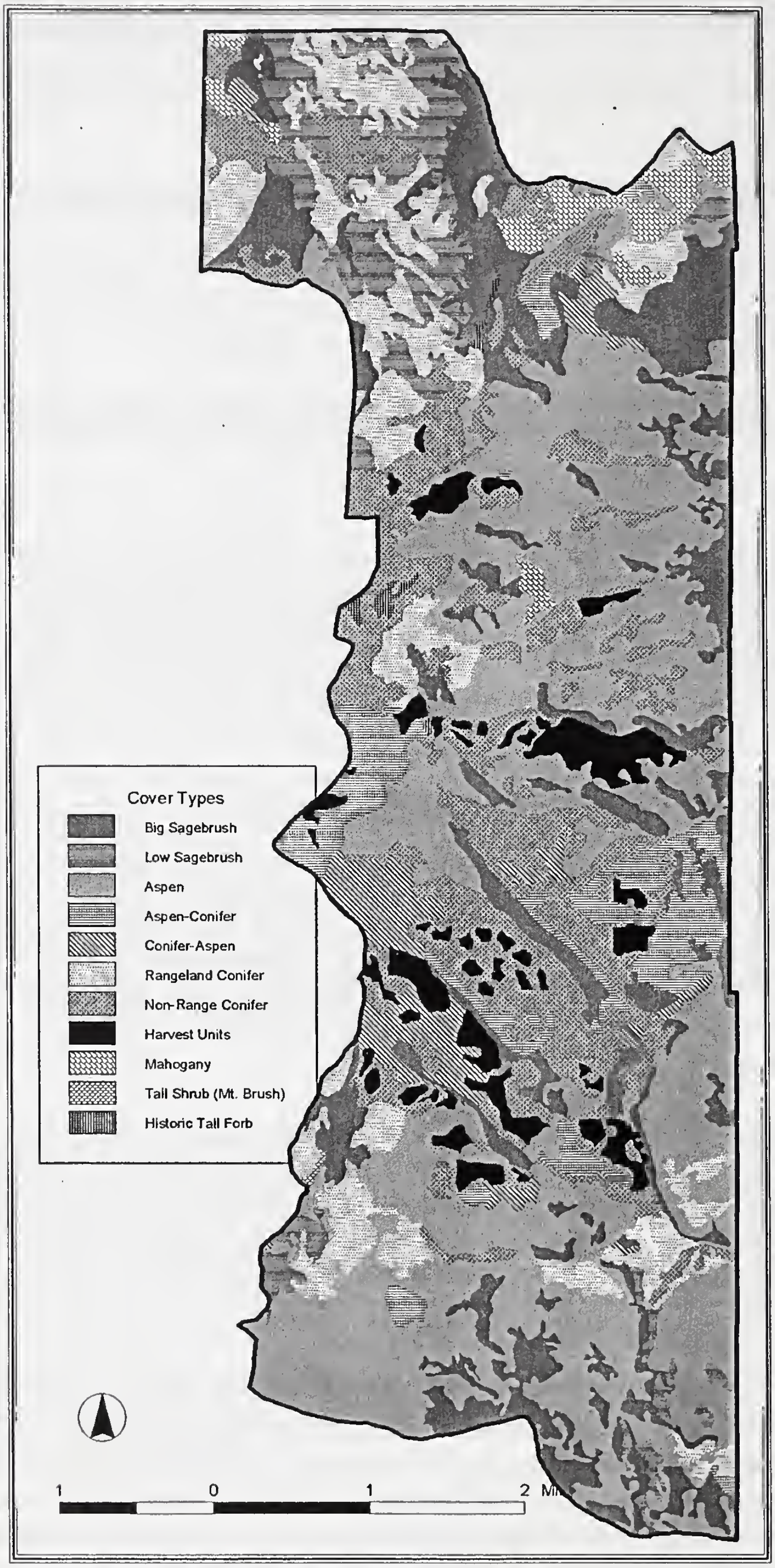


Figure 3.10 Distribution of vegetation cover types within the North Rich Allotment.

Table 3.12 Cover Types that occur on the North Rich Allotment.

Cover Type	Total Acres	Percent of Total	Mean Production (lbs/acre)
Rangeland Conifer	2,789	10.2	694
Non-Range Conifer	4,463	16.2	X
Harvest Units	1,305	4.7	X
Aspen	9,434	34.3	1235
Aspen-Conifer	1,455	5.3	
Conifer-Aspen	1,015	3.7	
Total Aspen	11,904	43.3	
Big Sagebrush	4,671	17.0	460
Low Sagebrush	1,693	6.2	X
Total Sagebrush	6,364	23.2	
Mahogany	552	2.0	382
Mountain Brush	17	0.1	880
Historic Tall Forb	74	0.3	X
Total	27,468	100.0	

Rangeland Conifer Cover Types

The Rangeland Conifer Cover Type (Figure 3.11) is dominated by Douglas-fir and Mixed Conifer communities, but also includes the Engelmann spruce-Subalpine fir and Lodgepole Pine Subject Areas (SA) described in the PFC document. This conifer cover type produces more than 200 lbs/acre livestock forage and is, therefore, considered as forage-producing rangeland.

The forage-producing herbaceous understory vegetation is typically confined to small openings in these communities. It has limited value for livestock grazing, but does produce over 200 lbs/acre so is considered capable rangeland in this allotment.

In general, vegetation trend of these communities in the 1960's was determined to be downward, and nearly two-third of the acres of this type were determined to be in fair to poor condition. Today, these conditions appear to persist especially near water sources and other more-desirable forage areas. Some small openings have had gopher activity, however, that may reduce this ground cover significantly.

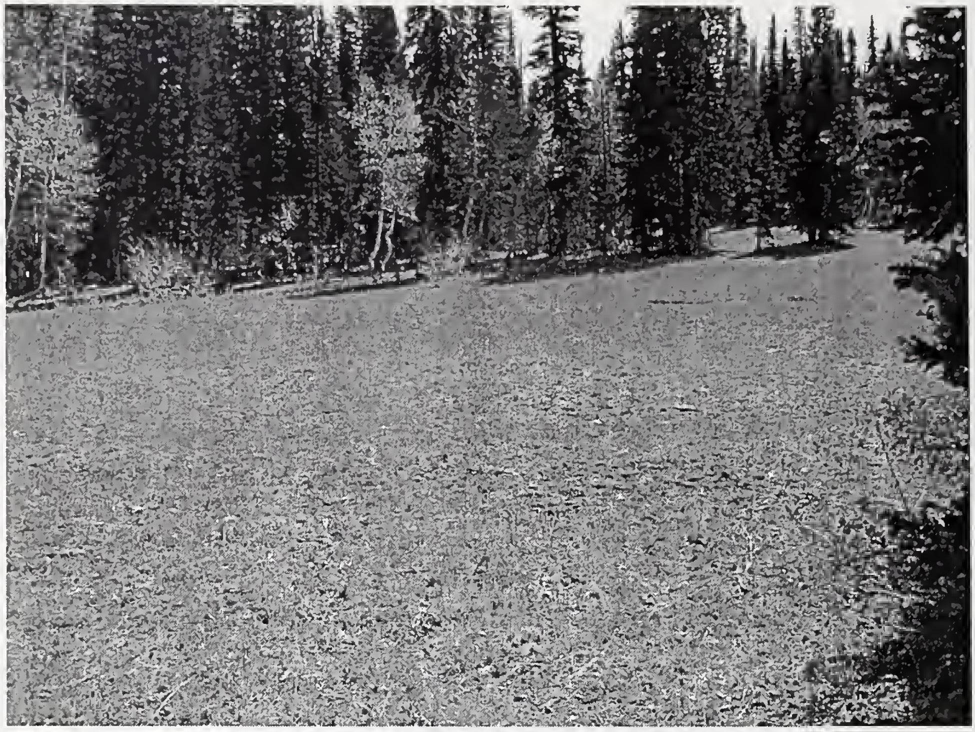


Figure 3.11 Rangeland Conifer community (background) with a large opening of what historically was a Tall Forb Community (foreground).

Non-Range Conifer Cover Type

The Non-Range Conifer type is primarily dominated by Lodgepole pine with Douglas-fir as a significant component. In addition this type includes Engelmann spruce-Subalpine fir (Figure 3.12) and Mixed Conifer communities. Unlike the Rangeland Conifer cover type the Non-Range Conifer cover type typically has a more-dense overstory and produces less than 200 lbs/acre livestock forage. It is, therefore, not considered to be capable rangeland. Conditions are satisfactory in these communities because they do not produce significant forage, and because livestock generally do not spend, and have not spent, significant time in these areas.

In the North Rich Allotment, a portion of the Engelmann spruce-Subalpine fir component of this cover type was being treated to reduce risk from spruce beetle infestations. This spruce-fir portion of the allotment is considered to be a critical part of a large north-south wildlife migration corridor and maintaining this type is very important. The spruce-fir stands generally occur on the upper elevations in the allotment, while the lodgepole pine stands of this type commonly occur as stringers along the north facing slopes of ridges and are not necessarily contiguous.

Figure 3.12 Non-range Conifer Cover Type (dominated by Engelmann spruce and subalpine fir) near the eastern portion of the allotment in the Bear Hodges Timber Sale Unit. This illustrates the dense overstory and low production of herbaceous undergrowth.

Harvest Units

Timber sales that have occurred within the North Rich Allotment are shown in Table 3.13. These primarily occurred in the Lodgepole Pine portion of the Non-range Conifer cover type. Over the last 20 years about 15% of the conifer communities in this allotment have been logged (4.7 percent of the entire allotment). Until recently, relatively small cutting units have been used that were not comparable in size to those created by natural disturbances (fires). These previous methods of cutting created many smaller openings and uncommon patchiness of stands along the stringers. The Bear Hodges timber harvest focused on recreating larger openings in the lodgepole pine, which is more consistent with historic fire patterns that once occurred on these landscapes.

Figure 3.13 shows the site characteristics following the Bear Hodges timber harvest (most recent) and the amount of large woody debris ($\geq$ 10 tons per acre) that remains on the cut units, which is significantly greater that that left after the previous timber sales. This was done to assure the proper amount of nutrients return to the soils to maintain productivity of these sites. In addition, this debris creates more-varied habitat for wildlife. While not a direct purpose for leaving the large amount of woody debris, these new harvest methods result in fewer livestock numbers using these areas than used the more open harvest units of the past. Livestock use, however, has not resulted in inadequate stocking of trees following harvest in any of these harvest units.

Table 3.13 Timber sales that occurred within the boundaries of the North Rich Allotment.

Sale Name	Number of Units	Total Acres	Type Cut[1]
Bear Hodges	1	194	CC
Bear Hodges	1	76	PC
Cheney	1	47	CC
Dugway Spring	5	58	CC
Elk Springs[2]	1	36	CC
Hells Hollow	2	103	CC
Jebo-Private	1	37	CC
Little Bear	2	77	CC
Log Cabin Ridge	11	108	CC
Log Cabin-Dugway	2	25	CC
Log Cabin-Dugway	8	311	PC
Slideout	8	94	CC
South Sink[3]	2	4	CC
State	2	73	CC
	Total	1243	

Natural regeneration of lodgepole pine has successfully occurred in the majority of the harvest units listed in Table 3.7 (regeneration survey data are available in the project file). For example, regeneration surveys conducted in the Slideout units in 2002 indicate lodgepole pine seedling densities range from 400 to 5,000 per acre. Most units have at least 2,000 stems per acre. The required minimum stocking level for lodgepole pine is 150 seedlings per acre (Forest Plan Guideline 70). However, portions of two harvest units in the Elk Springs and South Sinks timber sales, harvested in the early 1970's, have not regenerated well. Surveys in 2002 show stocking to be between 140 and 400 seedlings per acre. The low stocking is not the result of livestock grazing, but rather the result of application of an inappropriate silviculture method (clearcutting a large area in an Engelmann spruce/subalpine fir forest type) as indicated as "not acceptable" in the Revised Forest Plan Guideline 69.

Conditions in these harvest units noted in Table 3.13 vary significantly, with some having a high amount of thistle that was introduced through the vehicles used in the areas during tree harvest and log transport. Livestock use has occurred historically in these units, but has not been determined to be the primary factor for weed establishment in these areas.

[1] CC = Clear Cut, PC = Partial Cut

[2] Total harvest acres equal 38 acres. Two acres of the Elk Springs timber harvest units are within the Little Bear Allotment west of North Rich Allotment.

[3] Only four acres of the 80 acre South Sink timber harvest units are within the North Rich Allotment. The remaining 76 acres are in the Little Bear Allotment to the west.

Figure 3.13 Clear-cut harvest unit within Bear Hodges timber sale in the North Rich Allotment resulting in some transitory range and a large amount of down woody debris (≥10 tons/acre).

Aspen Cover Types

Aspen Cover Types have been divided into three components, which include:

- Aspen Cover Type (overstory canopy dominated by pure aspen);
- Aspen-Conifer Cover Type (less than 50% of the canopy, but more than 15 percent is dominated by conifer);
- Conifer-Aspen Cover Type (more than 50% of the canopy is dominated by conifer).

Within the allotment, nearly all aspen is mature with only a small percent (less than 5 percent) in a young age class because of fire. More than 12 percent of the aspen communities in the allotment are classified as Aspen-Conifer and approximately 9 percent are classified as Conifer-Aspen. These types are moving quickly toward the Rangeland Conifer cover type and/or the Non-range Conifer cover type, which produce much less forage than the Aspen cover type. Forestwide, it has been estimated that the forest has lost approximately 65 percent of its aspen to conifer dominance (USDA Forest Service 2003).

Fire is a natural component in the rejuvenation of aspen communities. The Edgar Fire in 1994 burned approximately 400 acres of aspen and 100 acres of conifer within the North Rich Allotment in 1994 on the eastern border of the North Rich Allotment. This burned area dominated by aspen and conifer has returned primarily to an aspen cover type.

Livestock grazing on the portion of the burn within the allotment was light enough that regeneration of aspen was successful. Heavy use on resprouting aspen following fire, however, can limit the ability of aspen to regenerate and, therefore, a guideline (G73) has been included in the 2003 Forest Plan (USDA Forest Service 2003) that delays livestock use until aspen reach an average height of 6 feet before grazing is allowed.

Aspen communities in the North Rich Allotment were included in a broader analysis of aspen age class diversity in the Bear River Range portion of the Wasatch-Cache National Forest (USDA Forest Service 2002b). Areas within the allotment were identified as areas for prescribe burning to increase age class diversity of aspen in this portion of the Forest. These units are identified in the Alternatives, Chapter 2.

Mueggler (1988) noted that some species commonly occurring in aspen community types are susceptible to excessive grazing and browsing, such as serviceberry (*Amelanchier alnifolia*), chokecherry (*Prunus virginiana*), elderberry (*Sambucus* spp.), cow parsnip (*Heracleum lanatum*), western sweet-cicely (*Osmorhiza occidentalis*), and scarlet paintbrush (*Castilleja miniata*) while others increase under heavy grazing pressure including western coneflower (*Rudbeckia occidentalis*), Kentucky bluegrass (*Poa pratensis*), common dandelion (*Taraxacum officinale*), weedy milkvetch (*Astragalus miser*), and woodlove (*Nemophila breviflora*).

Nearly all the aspen communities visited within the allotment are described as grazing-induced (grazing-disclimax) community types by Mueggler (1988) and are typically dominated by one of more of these latter species. These communities lack the diversity in species composition and structure that is desirable as habitat for a variety of wildlife species. Places where these conditions do not exist are in areas further away from water. In both the climax and seral aspen communities, understory vegetation has changed from a variety of Tall Forbs in the undergrowth (Mueggler 1988) to a dominance of species such as Kentucky bluegrass (*Poa pratensis*), mountain brome (*Bromus carinatus*), western coneflower (*Rudbeckia occidentalis*), and/or sawleaf butterweed (*Senecio serra*). In some areas adjacent to water where livestock have concentrated, tarweed (*Madia glomerata*) is a common component with subsequently low ground cover. Potential ground cover in all aspen community types is nearly 100 percent (USDA Forest Service 1996).

Livestock grazing appears to be eliminating aspen regeneration in two areas where beaver activity has occurred in the southern portion of the allotment. Beavers at Willow Springs and Bench Ponds (ponds on the bench above the Hells Hollow springs) have harvested aspen to create these ponds. Because of the heavy livestock use in these watering areas, it is assumed that their browsing is keeping the aspen from regenerating. It is estimated that approximately 10 acres have been affected at Bench Ponds and approximately 25 acres at Willow Springs.

Figures 3.14 and 3.15 illustrate two of these grazing-induced types (Aspen/Mountain Brome and Aspen/Kentucky Bluegrass c.t.s respectively) and the resulting lack of diversity in the understory. Figure 3.16 illustrates an Aspen/Tall Forb c.t. in the allotment that, while producing more than these other types, is dominated by western coneflower (*Rudbeckia occidentalis*), an increaser under heavy grazing use. Mueggler

(1988) noted that "Undergrowth dominated by such relatively unpalatable forbs as *Rudbeckia occidentalis* [western coneflower] frequently results from many years of excessive grazing in the *Populus tremuloides* [Aspen]/Tall Forb c.t."

Figure 3.14 Aspen/Mountain Brome community type in the central portion of the allotment. Note the general lack of a shrub component in an open understory.

Figure 3.15 Aspen /Kentucky Bluegrass community type in the North Rich Allotment showing a low structural diversity. This type generally produces less than 700 total lbs/acre, (averaged about 625 lbs/acre forbs and grasses, combined).

Figure 3.16 Aspen/Tall Forb community type in the North Rich Allotment, with high cover of western coneflower (*Rudbeckia occidentalis*). Note the higher amount of remaining herbaceous material. This type generally produces over 1,100 lbs/acre (1054 lbs/acre grasses and forbs).

Forage production information for various aspen community types from Mueggler (1988) shows that overall the Aspen/Kentucky Bluegrass c.t. produces the least amount (averages 689 lbs/acre ranging from 303 lbs/acre to 1,289 lbs/acre). Production data from the 1960's for aspen communities throughout this allotment averaged about 1,070 lbs/acre, but ranged from 48 lbs/acre to about 1,975 lbs/acre.

Sagebrush Cover Types

There are at least three different species, subspecies, and/or varieties of sagebrush that occur on the North Rich Allotment. These include mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*), spiked big sagebrush (*Artemisia tridentata* ssp. *spiciformis*), and low sagebrush (*Artemisia arbuscula*). Figure 3.17 illustrates the different locations of mountain big sagebrush and low sagebrush on the landscape.

The most common big sagebrush variety occurring is mountain big sagebrush (Figure 3.18). The least common is spiked big sagebrush. Combined, these two sagebrush varieties occupy less than 4,700 acres, or 17 percent of the allotment. Spiked big sagebrush occurs on sites with greater water-holding capacities, which are capable of producing higher amounts of forage and often a greater diversity of understory species

than the mountain big sagebrush sites. These spiked big sagebrush communities often have an obvious component of snowberry.

The Edgar Fire in 1994 burned approximately 40 acres of sagebrush communities within the North Rich Allotment in 1994 on the eastern border of the North Rich Allotment. Other than these burned acres, nearly all big sagebrush communities have high canopy cover within the allotment.

Figure 3.17 Mountain big sagebrush communities (foreground) and low sagebrush communities (upper portion of photo) in the North Rich Allotment, illustrating the distinction between the relatively deep soils of the mountain big sagebrush communities and the shallow, rocky soils on which the low sagebrush occurs.

Ground cover measurements were taken at several mountain big sagebrush locations in the northern portion of the allotment (Middle Sink to South Sink) to determine existing conditions of these communities. The South Sink mountain big sagebrush site (Figure 3.18) had 48 percent ground cover, well below the desired condition for this type. Ground cover measurements in mountain big sagebrush sites ranged from 36 to 72 percent as shown in Table 3.14. The 36 percent ground cover measurement was on a mountain big sagebrush community where sagebrush has been replaced by rabbitbrush (*Chrysothamnus viscidiflorus*).

Additional ground cover measurements in mountain big sagebrush sites have been taken at two long-term monitoring sites (Peter Sink and South Sink) and are shown in Table 3.8. Mountain big sagebrush and spiked big sagebrush communities through much of the Middle, South and Peter Sinks areas are in unsatisfactory condition, having low ground cover. These conditions were also noted near Mill Hollow and Tincup Springs areas as

well as other areas within the allotment. Even low sagebrush communities, such as those shown in Figure 3.19, are in unsatisfactory condition because, while they generally produce less than 200 lbs/acre, here they produce significantly less than that. In general, areas of big sagebrush (both mountain and spiked big sagebrush) that represent better conditions occur on steeper slopes and are further away from water.

Figure 3.18 Mountain big sagebrush site in South Sink adjacent to FS Road 055 in the northern portion of the North Rich Allotment.

Table 3.14 Ground cover measurements of mountain big sagebrush sites taken at several locations within the North Rich Allotment.

Sample Site	Percent Ground Cover[1, 2]
South Sink	48
Middle Sink #1	52
Middle Sink #2	72
South Sink - Rabbitbrush-dominated	36

[1] Ground cover is comprised of litter, vegetation, rock, as well as moss where it occurs
[2] Desired condition is 85 percent of potential, or 73 percent (0.85 X 86 percent)

Low sagebrush (Figure 3.19) typically occurs on rocky sites with relatively low productivity and even lower diversity of understory species. It is more common in the northern portion of the allotment and occupies approximately 1,700 acres, or 6 percent of the allotment. Dr. Alma Winward (pers. comm. 2001) indicated that these low sagebrush sites, because of their inherently droughty conditions (rocky, well-drained soils) rarely produce as much as 200 lbs/acre.

Figure 3.19 Low sagebrush site in the South Sink area of the North Rich Allotment showing the high rock cover and low herbaceous production of these sites.

Microbiotic Crusts

Belnap and others (2001) noted that mountain big sagebrush sites tend to lack "significant biological crust cover" because of typically dense vascular plant cover and litter, but that if present they are often disturbed by livestock use. Kaltenecker and Wicklow-Howard (1994) also noted that microbiotic crusts are unlikely on mountain big sagebrush habitat types on gravelly soils in higher precipitation zones with high forb and graminoid cover. These authors also found these crusts unlikely in spiked big sagebrush communities because of the presence of a dense herbaceous understory. Kaltenecker and Wicklow-Howard noted that microbiotic crusts were not "predominant" in low sagebrush habitat types because of the stony nature of the soils.

Mountain Mahogany Cover Type

This type occurs primarily in the northern portion of the allotment on rocky outcrops, often near ridge crests. On this allotment, currlleaf mountain mahogany (*Cercocarpos ledifolius*) is the dominant overstory species within this cover type. Studies conducted in 2003 showed that, for the most part, mountain mahogany communities in the North Rich Allotment are healthy and in satisfactory condition.

Mountain Brush Cover Type

This vegetation type is not common within the allotment, but is primarily dominated by snowberry (*Symphoricarpos oreophilus*). It often occurs on highly productive sites adjacent to aspen and sagebrush cover types. These communities appear to be in satisfactory condition, although only few have been noted within the allotment boundary. Many spiked big sagebrush communities have a significant snowberry component and may, therefore, be confused with this Mountain Brush cover type.

Historical Tall Forb Cover Type

The Tall Forb Cover Type communities were historically dominated by species in the Tall Forb group, but are currently dominated by annual forbs. None of the communities that occurred historically as the Tall Forb type are in satisfactory condition. All sites visited had a high amount of bare ground and none had more than a few species that typically dominate this type. Species such as sticky geranium and lupine were noted as scattered individuals in some area, but annuals, such as knotweed and tarweed were present in all sites. These communities, when in satisfactory condition, include a wide array of flowering plants and some grasses that provide of valuable wildlife habitat and plant diversity. While making up a small portion of the allotment, these areas have been eliminated through an estimated 50 percent of their historic range on the Forest.

These communities occur as small, scattered sites throughout the North Rich Allotment and as a few larger stands near South Sink and upper Jebo Creek area. This type is considered to be at high risk according to the PFC assessment because at least half of these communities no longer exist on the Wasatch-Cache National Forest as a result of historic livestock grazing. On the North Rich Allotment, examples of areas where this type has been degraded occur along the road in South Sink where ground cover was measured in 2001 at approximately 22% (Figure 3.20). Potential ground cover in the Tall Forb type was measured between 49 and 75 percent (USDA Forest Service 1996). Willow Creek Ecology (1998b, 2000) measured ground cover at sites within the allotment that were likely historically dominated by tall forb communities near Richardson Fork Creek and along the Peter Sink Road. Ground cover measurements at these sites were 21 percent and 36 percent respectively. The Peter Sink site appears to have a high amount of activity from gophers. These mean ground cover measurements are consistent with our measurements noted above.

Figure 3.20 Historic Tall Forb site in South Sink that no longer supports the Tall Forb Species. Ground Cover was measured at 22 percent in 2001.

It is possible that this site has lost enough topsoil to reduce the potential of this site to support a Tall Forb community again. The historical Tall Forb type in Upper Jebo shows evidence of recovery. Attempts have been made to revegetate areas in South Sink, but have been unsuccessful.

Temple Flat is a disturbed meadow site that may have once been either a Tall Forb site or, more likely, was a tufted hairgrass (*Deschampsia cespitosa*) meadow. This site is currently dominated by Aster (*Aster* spp.), Kentucky bluegrass (*Poa pratensis*), and a variety of other species such as Letterman's needlegrass (*Stipa lettermannii*), onespike oatgrass (*Danthonia unispicata*), and wiregrass (*Juncus* spp).

3.7.2.2 Riparian Cover Types

Riparian communities in the North Rich Allotment make up less than one percent of the total allotment acres and occur adjacent to the few perennial streams and associated with natural and developed springs and catchments. A Level 2 assessment of the riparian plant community conditions completed in 2001 for the Mill Hollow, upper portions of Cheney Creek, and Bear Wallow, found that each sampled segment of these drainages was in very early seral condition, with 15 percent or less of the plant communities being late seral communities. A Level 2 assessment conducted in 1992 on the Hells Hollow and Saddle Creek portions within the North Rich Allotment found that two riparian complexes were classified as early seral, with 16-40 percent late seral plant communities, and one complex was in mid seral condition with 41-60 percent late seral plant communities.

The Hells Hollow/Saddle Creek Complexes were fenced in 1993 with the proposal to rest the riparian pasture for five years then allow limited grazing that does not exceed utilization standards. The northern portion of this exclosure was first rested in 1994, while the southern pasture was lightly used that year. In 1999 a section of the stream in upper Hells Hollow went underground in a sinkhole formed in an old beaver dam area, essentially removing surface water from this portion of the system. In 2003, it appears that surface water has once again been restored to this area.

Long-term trend is determined from repeated measurements on permanent benchmarks which are much more reliable that a one-time measurement and/or observation. The change in direction of repeated measurements of attributes, which express the desired future condition over time, is long-term trend. A description of what the trend attributes measured are should be expressed. Condition should be described as "meeting" or "not meeting" desired conditions. And if conditions are not meeting desired conditions they should be described as "moving toward" or “not moving toward” desired conditions.

3.7.2.3 Noxious Weeds

Musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), Canada thistle (*Cirsium arvense*), dyers woad (*Isatis tinctora*), and black henbane (*Hyoscyamus niger*) are either present in or adjacent to the North Rich Allotment. Musk thistle has been noted along the Sinks road, in Mill Hollow, and in Temple Canyon. Canada thistle, which is typically confined to riparian areas, has been noted in Hodges Canyon, in the Log Cabin timber sale area, Hells Hollow, Mill Hollow, and on Saddle Creek. The occurrence of these thistles is attributed more to the management actions associated with timber harvest and other human activities in the area than to livestock grazing. Dyers woad has been found at Adams Corral and in Log Cabin Hollow. Black henbane has only been noted outside the allotment to the north in the Middle Sink area, but likely occurs elsewhere within the allotment. Spotted knapweed occurs in the lower portion of the Saddle Creek exclosure on the south end of the allotment.

3.7.2.4 Management Indicator Communities

The Oak-Maple and Sagebrush plant communities were identified in the revised forest plan (USDA Forest Service 2003) as indicator communities. While the Oak-Maple community does not occur in the project area, the Sagebrush community does. Forest-wide, these Sagebrush communities are skewed toward the older age classes with more dense sagebrush cover. As noted in the FEIS for Forest Plan revision many sagebrush communities are dominated by stands with more than 15% sagebrush canopy cover due to a combination of fire suppression and livestock grazing. Historically, fires occurred in sagebrush every 20-40 year; these fires created mosaic patterns of different canopy cover. Sagebrush communities dominated by spiked big sagebrush, which is capable of sprouting after fire, returned more quickly to preburn conditions than did mountain big

sagebrush and low sagebrush communities. These species and conditions are found on the North Rich Allotment.

3.7.2.5 Threatened, Endangered, and Sensitive Plants

No federally listed (threatened or endangered), Forest Service Sensitive, or Wasatch-Cache National Forest Recommended Sensitive plants occur within the North Rich Allotment. One plant of brownie ladyslipper (*Cypripedium fasciculatum*) was observed nearly 6 miles northeast of the allotment, near Doubletop Mountain. No plants have been found in the North Rich allotment. In addition, habitat for this species is typically in forests with moderate to dense overstory, a predominance of duff and litter, and a subsequent lack in forage. Starvling milkvetch (*Astragalus jejunus* var. *jejunus*) has been noted only at lower elevations east of the Forest in Rich County. Logan buckwheat (*Eriogonum brevicaule* var. *loganum*) occurs west of the allotment in Steele Hollow. Habitat may be present for this species, and additional surveys will be conducted during the 2003 field season.

Wasatch rockcress (*Arabis lasiocarpa*), a Wasatch-Cache National Forest watch list plant, is known to occur in Sunrise Campground and about ½ mile south of the Bear Lake Summit near the northern boundary of the allotment. Its habitat has been noted as sagebrush, mountain brush, aspen, and spruce-fir communities at elevations within the range of the North Rich Allotment. It may occur within the allotment, but surveys have not been conducted for this species. As a watch list plant, activities that may potentially affect individuals are noted, but are not restricted unless they can potentially move these plants toward Forest Service Sensitive or Wasatch-Cache Recommended Sensitive status.

3.8 Water and Soils Resources

The purpose of this section is to explain and clarify the existing soil, hydrology, and watershed conditions within the North Rich Allotment.

3.8.1 Area of Influence

For direct and indirect effects on water and soils resources, the area of influence is the immediate area where grazing is taking place within the North Rich Allotment. For soils resources, the cumulative effects area is the North Rich Allotment because the productivity of the soils is confined to the allotment area.

For water resources cumulative effects, the area of influence is the hydrologic system that is affected by grazing the North Rich Allotment. This includes effects to portions of three watersheds. In the Bear Lake watershed, the area of influence is the area above the point where streams are diverted for irrigation purposes, for the most part located at the Forest Boundary. In the Blacksmith Fork watershed, it is the area above the point in Saddle Creek where beaver ponds are located (near the allotment boundary in the Hells Hollow exclosure - see Figure 3.1). This point is chosen because it is where water quality can change dramatically due to beaver activity. For the Logan River watershed, the area of influence for cumulative effects is the area within the allotment boundary. This includes the very upper reaches of Brush Creek, Rigby Hollow, Little Bear Creek, West Hodges Creek, Spawn Creek, Temple Fork, and Right Hand Fork of Logan Canyon. Because the affected portions of these watersheds are small and high in the drainage, proposed management activities will have a non-measurable effect on the soil and water conditions in these watersheds or the Logan River watershed (USGS maps available in the project file).

3.8.2 Historical Information

Current conditions are the result of years of activities in the North Rich Allotment, which were common throughout much of northern Utah. A summary of the allotment history is provided in Chapter 3, Section 3.4.3.

3.8.3 Soils

Much of the allotment, from Richardson Creek south to the allotment boundary, contains deep and very deep soil types formed from conglomerate rocks of the tertiary aged Wasatch formation. Soil conditions on these productive sites range from fair to excellent.

The northern portion of the allotment, from Richardson Creek west through the Middle, South, and Peter Sinks solution collapse (sink) basins, contains very rocky and shallow soils formed in limestone and dolomite bedrock of the Cambrian-aged Nounan, Bloomington, and Blacksmith formations. Other shallow rocky soils in this area are formed in quartzite bedrock of the Cambrian aged Geertsen formation. These relatively infertile sites in this area are also quite droughty in nature due to the inherently poor

moisture holding capacity, rapid permeability, and overall rockiness of the soils that occur there.

While much of the North Rich Allotment has good ground cover and soil protection, several areas within the allotment have soils with degraded conditions that are found in specific, predictable locations. These areas are within sinks, in areas of poor soil productivity that is likely caused by historic overgrazing, and in riparian areas. Soil degradation commonly occurs from low ground cover, compacted or puddled surface soil horizons, and accelerated rill and gully erosion. Recent field surveys of the allotment noted degraded soil conditions occurring in portions of the following vegetation communities (survey reports available in the project file):

1. Low Sagebrush - Established upon very thin, extremely rocky soils derived from limestone rock types within solution collapse (sink) basins.
2. Mt. Big Sagebrush - Established upon very thin and rocky soils derived from quartzite rock types along ridge tops.
3. Historic Tall Forb - Established upon deep and rocky soils derived from conglomerate rock types along north facing mid slope terraces, swales and gentle side slopes, often dominated by tarweed and knotweed.
4. Aspen communities dominated by grasses- Established upon deep soil derived from conglomerate rock types along north facing mountain slopes.
5. Riparian - Established upon deep riparian and wetland soils adjacent to springs, seeps, and streams.

Each vegetation community has an associated soil type. Information on soil types and mapping units that occur in the North Rich Allotment can be found in the Soil and Water Technical Report located in the FEIS project file.

Some sites within Mountain Big Sagebrush, Low Sagebrush and Historic Tall Forb communities are completely devoid of any humus enriched topsoil horizon. Inherent soil productivity is so low on these sites that weedy plant species have replaced the native grass and forb species. In these areas, ground covers are very poor and skewed toward rocks and weedy species such as mules ear dock, tarweed, and various annuals. Field evidence (Wasatch-Cache National Forest. 1999c) indicates that many of these areas have undergone a period of accelerated erosion where topsoil was lost, and that most of these areas have since stabilized.

In the Aspen and Riparian communities, degraded conditions are hurting soil productivity, but not to the point where long-term ability to support native grasses and forbs has been hampered. Remnant surface organic soil horizons are still present, and native species are able to reestablish and persist. Specific locations of degraded soil conditions are listed in Table 3.18 and discussed in further detail in Section 3.8.7 Watershed Conditions.

3.8.4 Hydrology

The North Rich allotment is located in the Bear River Range and drains into three major watersheds, the Logan River, the Blacksmith Fork, and the Bear Lake watersheds. From north to south, areas within the allotment that drain to the west into the Logan River watershed include small areas at the very headwaters of Little Bear Creek, Hodges Creek, Temple Fork, and Right Hand Fork of the Logan River.

Log Cabin Hollow, Bear Hollow, and Mill Hollow drain into Hells Hollow that drains to the south into Saddle Creek at the headwaters of the Blacksmith Fork watershed.

Areas draining to the east into the Bear Lake watershed include Hodges, Richardson, Cheney, Jebo, Slideout, Tufts, Temple, and Dry Canyons, and small parts of Edgar, Birch, and Cottonwood Canyons. There are 11 springs in the Bear Lake drainage, no springs within the Logan drainage, and 12 springs within the Blacksmith Fork drainage, as identified on USGS topograpic maps. The springs are listed in Table 3.15.

Several sinks are located in the northern part of the allotment and include Middle Sink, South Sink, and Peter Sink. The sinks drain into bedrock through a karst hydrologic system that comes to the ground surface through a series of springs located on the east and west side of the Bear River Range.

3.8.5 Water Quality

The State of Utah has designated the streams draining the North Rich Allotment above the National Forest boundary as Anti-degradation Segments. This indicates that the existing water quality is better than the established standards for the designated beneficial uses. Water quality is required by state regulation to be maintained at this level. The beneficial uses of streams within the allotment, as designated by the Utah Department of Environmental Quality, Division of Water Quality, are:

- Class 2B – protected for recreation
- Class 3A – protected for cold water species of game fish and other cold water aquatic species
- Class 4 – protected for agricultural uses.

Also, the beneficial use of streams draining into the Logan River watershed include Class 3D – protected for waterfowl, shore birds and other water-related wildlife, and necessary aquatic organisms in their food chain. The numeric water quality standards can be found in Section R317-2, Utah Administrative Code, *Standards of Quality of Waters of the State* (Utah Department of Environmental Quality 2000a).

Table 3.15 Springs located within sub-drainages of the North Rich Allotment.

Drainage	Subdrainages	Springs
Bear Lake	South Sink	South Sink Spring
	Hodges Canyon	
	Richardson Fork	Richardson Spring
	Cheney Creek	North Cheney Spring, Cheney Springs
	Jebo Canyon	Jebo Spring, Jebo Troughs Spring, two unnamed springs in South Jebo Canyon
	Slideout Canyon	
	Tufts Canyon	Upper Tufts Spring, Lower Tufts Spring, unnamed spring in lower part of Middle Fork Tufts Canyon
	Temple Canyon	
	Edgar Canyon	
	Birch Canyon	
	Red Pine Canyon	
	Cottonwood Canyon	
Logan River	Middle Sink	
	Horse Lake Sink	
	Peter Sink	
	Brush Canyon	
	Rigby Hollow	
	Little Bear Canyon	
	West Hodges	
	Spawn Creek	
	Temple Fork	
	Right Hand Fork, Logan Canyon	
Blacksmith Fork	Log Cabin Hollow	Elk Spring
	Hells Hollow	Dugway Spring, Government Spring, Suck Spring, unnamed spring in lower part of Hells Hollow
	Bear Wallow	Tin Cup Spring
	Mill Hollow	Mill Spring, Nebeker Spring
	Saddle Creek	Willow Spring, Clay Seep, Hump Pond spring, Mahogany Spring

In the most recent assessment of water quality, the State of Utah has determined that the waters within the watersheds that drain the North Rich Allotment area fully support their beneficial uses (Utah Department of Environmental Quality 2000b). These include the Logan River drainage above the mouth of the canyon near Logan, Blacksmith Fork drainage above the mouth of the canyon near Hyrum, and streams draining into Bear Lake along the Bear River Range.

As part of Wasatch-Cache National Forest cooperative monitoring program with the State of Utah, the Forest collects water samples in selected drainages and sends them to the

State for analysis. During water year 1998, out of seven samples collected on the Left Hand Fork of Blacksmith Fork at the confluence of the Blacksmith Fork, total phosphorus exceeded the State standard (0.05 mg/l) in one water sample (0.073 mg/l) and in one sample (0.084 mg/l) out of four collected at the Right Fork of Logan River at the confluence of the Logan River. These samples were collected during spring runoff on May 12th reflecting increased sedimentation during the high flow period (Wasatch-Cache National Forest 1999b).

In 1997, Willow Creek Ecology, Inc. with support from other organizations, took water samples in Spawn Creek, a tributary of Temple Fork in the Logan River drainage. Water samples were analyzed for fecal coliform bacteria in order to determine effects of cattle grazing (Willow Creek Ecology 1998a). Water samples were collected at six sites. Two sites, First Left and Spawn Mouth, were sampled eight times between May 5, and September 23, 1997. The other four sites were sampled five to six times.

However, the Willow Creek Ecology, Inc. fecal coliform assessment was not performed according to water quality protocols established by the State of Utah. The State of Utah requires a minimum of bacterial samples collected six times within 30 days during the hottest time of the year. The Willow Creek Ecology, Inc. data were collected over a 143-day period (not 30 days in the hottest part of the year, per State protocol). Therefore, the data cannot be used to accurately assess whether bacterial water quality exceeds State water quality standards.

The Forest Service, in order to assess bacterial water quality, monitored fecal and total coliform bacteria in the Temple Fork drainage between July 22 and August 18, 1998, to assess the effects of livestock on bacteria in the stream (Wasatch-Cache National Forest 1999a). Samples were sent to the Bear River Health Department for analysis. Three sites were sampled eight times within thirty days during the hottest part of the year according to State protocols. Two of the sites sampled the same reaches as those sampled by Willow Creek Ecology. These are Spawn Mouth (R1) and First Right (1st Right). The sites are in stream channels 300 feet below a spring and near the confluence of Spawn Creek and Temple Fork. Another site was also monitored on Temple Fork about 1.5 miles upstream from Spawn Creek. Results are shown in Table 3.16.

Table 3.16 Geometric mean (counts/ml) for fecal and total coliform and State standards for three sites in Temple Fork and Spawn Creek drainages.

Location	Discharge Range (cfs[1], estimate)	Fecal Coliform geometric mean	Fecal Coliform State Standard	Total Coliform geometric mean	Total Coliform State Standard
Tributary to Spawn Creek 300 feet below spring (near First Right)	0.6 - 2.3	37.7	200	344.2	1,000
Spawn Creek near confluence with Temple Fork (near Spawn Mouth)	16.4 - 43.6	9.3	200	78.0	1,000
Temple Fork 1.5 miles upstream from Spawn Creek	37.1 – 71.0	1.9	200	60.1	1,000

[1] cfs = cubic feet per second

The State standards are in terms of a geometric mean of a minimum of eight samples as shown in Table 3.16. The results show that the concentrations of fecal and total bacteria are well below State standards and the amount of bacteria in the samples near the spring source is much higher than stream sites (Wasatch-Cache National Forest 1999a). Because situations are similar, this monitoring is assumed to be representative of bacterial conditions in stream water on other allotments on the WCNF, including the North Rich Allotment.

3.8.6 Wetland and Riparian Resources

The largest riparian and wetland areas are located in the southern portion of the allotment in Bear Hollow, Mill Hollow, and Hells Hollow where streams and springs flow perennially. Small riparian areas occur along the intermittent streams that drain into Bear Lake drainage primarily in those reaches where water comes to the surface of the streambed year-round. Small riparian areas occur below springs and seeps. The main springs on the allotment are listed in Table 3.15.

The ID team, using techniques developed by the Utah Riparian Coalition and modified by the Wasatch-Cache National Forest, identified riparian classes for each perennial stream segment identified in Table 3.17 below. The modifications state that if a Threatened, Endangered or Forest Service Sensitive species is present, it automatically shall be managed as a Class 1 segment. All natural and developed springs were collectively classified using the same process.

Table 3.17 Riparian Class Ratings for perennial stream segments, intermittent channel segments, natural springs, and developed springs and catchments in North Rich Allotment.

Stream Segment	Riparian Class
Hells Hollow/Saddle Creek	1[1]
Mill Hollow	2
Hodges Creek	2
Richardson Creek	2
North Cheney Creek	2
Cheney Creek	2
Bear Wallow	2
Dugway	1[2]
Intermittent Channel Segments	2
Natural Springs	2
Developed Springs and Catchments	2

[1] Bonneville cutthroat present
[2] Active goshawk territory

As noted in Section 3.7, in 1992, a Level 2 assessment was conducted on portions of Hells Hollow and Saddle Creek within the North Rich Allotment. Two complexes were classified as early seral (with 16-40 percent late seral plant communities in each of these complexes) and one complex was classified as mid seral (with 41-60 percent late seral plant communities in each of these complexes). A Level 2 assessment of the riparian plant community conditions was completed in 2001 for the Mill Hollow, upper portions of Cheney Creek, and Bear Wallow. Each riparian complex in these drainages was classified as very early seral with 15 percent or less late seral plant communities in each of the complexes. These early seral riparian communities have relatively weak rooting systems and are incapable of maintaining hydrologic function at the same level as deeply rooted, late seral communities.

The Hells Hollow and Saddle Creek complexes were fenced in 1993. According to allotment records (available in the project file) permittees constructed approximately one mile of fence along both sides of the Hells Hollow riparian area. The intent was to rest the riparian pasture for five years then allow limited grazing according to utilization standards. The area is divided by an alleyway, which allows movement of cattle across the riparian area (and divides the area into two pastures). The northern riparian pasture was first rested in 1994. The southern pasture was lightly used that year. Since its implementation in 1994, the Hells Hollow exclosure has resulted in re-establishment of grasses, recruitment of willows on the stream bars, and improved habitat for fish.

In 1999 it was observed that a section of the stream located near the northern fence line of the Hells Hollow exclosure (the upper Hells Hollow Complex 92-013) had gone underground in a sinkhole formed behind an old beaver dam, essentially removing surface water from this portion of the system. In 2003, it was noted that water had returned to the surface and, if it remains above-ground, should result in continued recovery of the riparian communities along this segment.

3.8.7 Watershed Conditions

A range condition survey was completed for the North Rich Allotment in 1962 (USDA Forest Service 1962). Among other properties, the survey characterized the current condition and trend of soils within the allotment. Of the nearly 23,500 range acres within the allotment at that time, approximately 37% had good or excellent soil conditions, while 38% had fair conditions and the remaining 25% was in poor condition. Nearly 42% of the range acres had a downward soil condition trend; almost all of these acres were rated with fair, poor, or very poor soil conditions. About 15 % of the allotment range acres were rated in fair condition, but with a downward trend, and thus were at risk of moving to poor or very poor condition classes.

US Forest Service resource specialists reviewed soil and water conditions in the field, in particular making ocular estimates of ground cover and accelerated erosion (reports are available in the project record). Results show that much of the upland area of the

allotment has adequate ground cover and soil protection based upon the lack of evidence of accelerated erosion and absence of soil erosion indicators such as active rill or gully formation, soil pedestals, and soil deposition. Small, localized areas within the allotment were identified as having degraded soil and/or water conditions. Sites NRR1 and NRU7 through NRU10 are reference locations considered not to be in degraded condition. While not every acre was surveyed for watershed condition, Table 3.18 is thought to represent the most degraded areas to be found within the allotment.

Since 1995, several field trips surveyed watershed conditions in Middle Sink, South Sink, Peter Sink, Horse Lake area, Little Bear drainage, Dugway Spring area, Mill Hollow, Hells Hollow, Log Cabin Hollow, Temple Canyon, Temple Flat, Tufts Creek, Slideout Canyon, Sunrise Campground, Hodges Canyon, North Cheney Spring, Edgar Canyon, the ridge south of Temple Flat, Richardson Creek area, Jebo Canyon, and Saddle Creek (field notes are available in the project file). Conditions for many of these areas are detailed in Table 3.18.

An overview of features and conditions in the North Rich Allotment is listed below:

- Two cross sections were measured in Slideout Canyon on May 22, 2000 as part of the Bear Hodges Timber Sale monitoring requirements. The channel bed and banks of the intermittent channels in the North Rich area vary greatly. Some are composed of cobble with some boulders and the others are composed of gravel and fine materials. High pea gravel content is seen in the intermittent drainage below Dugway Spring and is representative of channel substrate of other intermittent channels in the area.

- Most of the streams in North Rich area are ephemeral where water flows only during spring runoff. The remaining streams are mostly intermittent with perennial flow occurring in small reaches. Examples of these areas are Saddle Creek near the confluence of Mill Hollow, Hodges Creek, and Tufts Creek. Many of the perennial reaches have their water source from a spring or seep.

- Channel stability is affected by the amount and timing of water in the channel. In many perennial reaches deep-rooted vegetation stabilizes the channel banks. The stream reaches that are dry are unstable during high flow periods because of the lack of deep-rooted vegetation. Spring floods appear to move much of the channel bottom material and scour some banks as indicated by small cutbanks and fresh deposits of gravel.

Table 3.18 Notes on specific areas related to soil and water conditions.

Site	Location	Landscape Position	Est. acres[1]	Comments
NRR1	Horse Lake	Riparian		Good Condition.
NRR2	Tin Cup Spring	Riparian	6	Livestock trampling of wetland and spring.
NRR3	Drainage south of Temple Flat	Riparian	23	Road captures stream, rutting, poor road drainage, tarweed present.
NRR4	Government Spring	Riparian	4	Livestock trampling wetlands.
NRR5	Spring in Hells Hollow	Riparian	10	Trampling of wetland area.
NRR6	Spring in Hells Hollow	Riparian	3	Trampling of wetland area.
NRR7	Clay Seep	Riparian	6	Headcutting, low ground cover, tarweed present.
NRR8	SW of Clay Secp	Riparian	4	Headcutting, low ground cover, tarweed present.
NRR9	Mill Hollow	Riparian	9	Livestock trampling of spring and wetland, old gully.
NRR10	Mill Spring	Riparian	10	Livestock trampling of spring and wetland.
NRR11	Mill Hollow	Riparian	4	Livestock trampling of spring and wetland.
NRR12	Hodges Canyon	Riparian	30	Streambank and riparian damage, primarily from ATV use.
NRR13	Richardson Fork	Riparian	13	Riparian trampled by livestock and salt placed near riparian area.
NRR14	North Cheney Spring	Riparian	9	Livestock trampling and ATV damage in wetland.
NRT1	Head of Jebo Canyon	Uplands	13	Tarweed flats, upward trend, gullies healing, improved plant diversity.
NRT2	Head of Jebo Canyon	Uplands	3	Tarweed flats, upward trend, gullies healing, improved plant diversity.
NRT3	Head of Jebo Canyon	Uplands	4	Tarweed flats, upward trend, gullies healing, improved plant diversity.
NRT4	Head of Slideout Cyn	Uplands	9	Tarweed flats, stable to upward trend, gullies healing, diverse grass/forbs.
NRT5	Head of Slideout Cyn	Uplands	4	Tarweed flats, stable to upward trend, gullies healing, diverse grass/forbs.
NRT6	Head of Tufts Canyon	Uplands	6	Tarweed flats, stable to upward trend, gullies healing, diverse grass/forbs.
NRT7	Head of Tufts Canyon	Uplands	7	Tarweed flats, stable to upward trend, gullies healing, diverse grass/forbs.
NRT8	Temple Flat	Uplands	12	Tarweed flat, disclimax, low ground cover and diversity.
NRT9	NE of Tin Cup Spring	Uplands	9	Tarweed area, low ground cover, low diversity.
NRU1	SW of Horse Lake	Uplands	4	Low ground cover and soil productivity, little current use.
NRU2	SW of Horse Lake	Uplands	4	Low ground cover and soil productivity, little current use.
NRU3	North side Tufts Canyon	Uplands	9	Low ground cover.
NRU4	North side Tufts Canyon	Uplands	4	Low ground cover.
NRU5	North side Tufts Canyon	Uplands	6	Low ground cover.
NRU6	North side Tufts Canyon	Uplands	3	Low ground cover.
NRU7	Log Cabin Ridge	Uplands	22	Good ground cover and at potential.
NRU8	Ridge S of Temple Flat	Uplands	12	Good ground cover at or near potential.
NRU9	Ridge S of Temple Flat	Uplands	12	Good ground cover at or near potential.
NRU10	Ridge S of Temple Flat	Uplands	13	Good ground cover at or near potential.
NRU11	Just N of Cheney Spring	Uplands	6	Low ground cover and gully.
NRU12	SE of South Sink	Uplands	6	Low ground cover.
NRU13	East side of South Sink	Uplands	10	Low ground cover and soil loss.
NRU14	Saddle between Middle and South Sinks	Uplands	6	Poor ground cover.
NRU16	Lone Pine Flat	Uplands	9	Gully erosion due to road.
NRU17	North of Peter Sinks	Uplands	4	Low ground cover and soil productivity.
NRU18	North of Peter Sinks	Uplands	10	Low ground cover and soil productivity.
NRU19	Peter Sinks	Uplands	81	Low ground cover and no grass/forb layer.
NRU20	Southwest of Peter Sink	Uplands	130	Low ground cover low soil productivity, disclimax, very little current use.
NRU21	North of Tin Cup Spring	Uplands	12	Sagebrush area with high canopy and low grass/forb cover.
NRU22	NE of Tin Cup Spring	Uplands	9	Gully forming in road surface.

[1] Acres were tallied using a dot grid and topography map, and estimates based on field visit.

- Stream types and conditions are summarized from the soil and water technical report (available in project file). The streams were classified using Rosgen (1996) protocols and stream stability conditions were noted using Pfankuch (1975) protocols.

Mill Hollow - Most of the stream in the lower 1.6 miles of Mill Hollow is classified as C3/C4 and B3 Rosgen stream types with a small amount of G4 (gully-type). The stability ratings for these stream reaches are right at the break between good and poor due mainly from the small size and amount of bank rock, mass wasting in the upper banks that are of moderate frequency and size with some raw spots eroded by floodwaters, and lower banks with small cobble size material. Beaver ponds are located between the road and the confluence with Hells Hollow.

Hells Hollow and Log Cabin Hollow - The lower part of Hells Hollow to about 0.6 miles above Mill Hollow is an area of active and inactive or blown out beaver dams. Perennial flow in the stream ends about 0.5 miles above the confluence of Mill Hollow Creek. Above this point to the upper end of Log Cabin Hollow the channel is mainly a C4 or B4 Rosgen stream type and carries a bed load consisting mainly of small gravel, sand, and silt. In Hells Hollow, the road crosses the stream 6 times using fords and sediment from the road contributes to sediment in the stream. In the last couple years, maintenance has improved the road surface by covering it with gravel reducing sediment going into the stream channel. No road crossings occur along Log Cabin Hollow Creek in the surveyed area.

The Pfankuch stability survey shows that in Hells Hollow about 72% of the stream has fair to poor lower bank rock content and moderate to excessive deposits of new gravel and accelerated bar development, and about half of the length of the channel bottom had loose to no consolidation or particle packing. A high amount of scouring and deposition occurred for about 300 feet below the confluence of the tributary from Dugway Spring.

The Pfankuch stability survey in Log Cabin Hollow shows that all of the length of the stream that was surveyed had bank vegetation with low vigor and shallow root mass and lower banks with only a small amount of small-cobble size rock for stabilizing the channel banks. About 23% of the stream length has channel bottom with less than half stable materials and deposits and scour occurring at obstructions, constrictions, and bends, and some filling of pools.

Areas that drain into Bear Lake Basin – Field trips were taken into areas of the allotment that drain into the Bear Lake Basin and include Hodges Creek, Richardson Fork, the upper part of Cheney Creek, Jebo Creek, Slideout Creek, Tufts Creek, Temple Canyon, Dry Canyon, and Birch Creek. The channels in these drainages vary primarily between a B3 and B4 Rosgen stream type. These channels are moderately confined and the channel bed is composed of either cobbles or gravel. Most bed load material is small gravel, sands and silts.

These streams have similar conditions in that the channels are ephemeral in the upper part of the watershed, are intermittent in the middle part of the watershed, and stream flow is fed by springs after a short spring runoff period. For example, during the late summer period Upper Tufts Spring originates under the stream channel itself and provides enough water to wet the channel for several hundred feet at which point the water flows under a dry channel bed for another hundred feet or so and then surfaces again and repeats this down the channel for some distance. Stream reaches that are dry for most of the year lack deep-rooted vegetation and rely primarily on cobbles and boulders for channel stability. During spring runoff or high intensity storms, smaller material such as sands and gravels are scoured from channel banks, move downstream and form fresh deposits of gravel in small bars.

- Other factors affecting channel stability are livestock grazing, wildlife and road location. In the dry reaches, livestock grazing tramples stream banks as seen in the lower part of Bear Hollow and Hells Hollow. In the perennial reaches, livestock trampling has pushed banks into the stream channel, created bare banks, and crushed deep-rooted vegetation as seen in Mill Hollow. In 1997, several beaver dams blew out in Hells Hollow and appear to be main cause of channel scour and deposition in the drainage. Some sections of roads in the area have poor drainage and move sediment into stream channels. This is seen on many roads in the area such as in Mill Hollow, on the road to the ridge south of Temple Flat, and in Hodges Creek.

- Road improvements have been done on main roads through the area. In 1997, the road in Hells Hollow was regraded and rutted areas had pit run surfacing (natural rounded rock with a clay binder) added to reduce erosion. Saddle Creek road also had pit run surfacing added to rutted areas and in places where the road was widened by users trying to find ways around rutted areas. The road was graded, pit run material added, and was narrowed and reseeded along the edge to reduce erosion from the road.

- Recreation use in the area has impacted soil and water resources mainly on trails. For example, the OHV trail located south of the confluence of Tuft Creek and South Tufts Creek is in need of water bars.

Willow Creek Ecology (1996, 1998b, 2000) described range conditions and identified areas on the North Rich Allotment with degraded soil, water, and vegetation conditions. These reports discussed ground cover, soil conditions, and riparian conditions. Forest specialists reviewed these documents (Wasatch-Cache National Forest 2000) and determined that, while accurate for the areas covered in these reports, in general, these sampled sites do not represent the soil conditions of most of the allotment. The two transects (Hodges and Richards) used to represent grazed sites are located on soils that are on the poorest sites. These areas are in need of improvement either through grazing management or projects that will improve conditions on these specific sites. However, they do not represent conditions found throughout the allotment.

3.9 Wildlife

The purpose of this section is to describe existing and potential habitat for and occurrences of game species, Neotropical migratory birds, management indicator species, threatened, endangered, and Forest Service sensitive species within this allotment.

3.9.1 Area of Influence

The area of influence for direct and indirect effects to wildlife is the area within the North Rich Allotment boundary (see Figure 1.1).

For huntable species such as deer and elk, information is recorded and displayed by harvest unit. The North Rich allotment lies within the Cache Harvest Unit 2 (Figure 3.21).

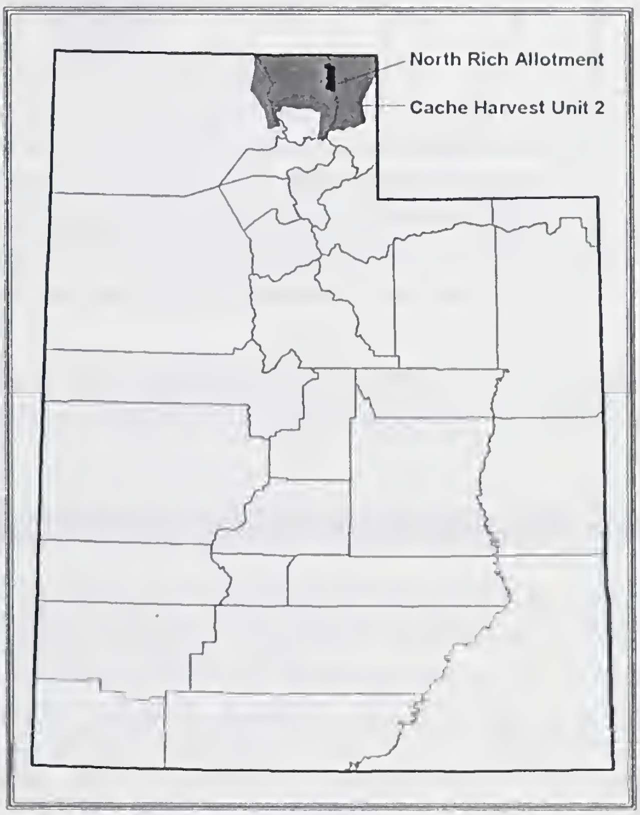


Figure 3.21 Location of the North Rich Allotment within Cache Harvest Unit 2 in northern Utah.

Also, the North Rich allotment is located within a portion of a wildlife corridor which has regional importance in providing linkage to other larger habitat areas (Figure 3.22). This is especially true for forest carnivors, such as the Canada lynx (see Section 3.9.2.3 Threatened, Endangered, Proposed, and Candidate Species). Most forest carivores have some preference

for forested conifer patches and maintaining connectivity between these patches throughout the corridor is of importance. Maintaining vegetation ageclass diversity within the corridor is also important to provide for the needs of a range of species.

Figure 3.22 Relationship of the North Rich Allotment on the Wasatch-Cache National Forest to the regionally significant north-south wildlife corridor.

3.9.2 Existing Conditions

Habitat is a key component of wildlife diversity and, therefore, the vegetation section of this document is important for the wildlife discussion. Livestock grazing can affect vegetation used by wildlife in several ways. In most instances, livestock grazing will not change the dominant overstory cover type that occurs, but can influence understory vegetation composition, cover, and forage production. Section 3.7 of this document provides information on each vegetation cover type, including the acres and percent of each type within the allotment.

A list of vertebrate wildlife species for the Wasatch-Cache National Forest (USDA Forest Service, 2003) is located in the project file. For game species, Utah Division of Wildlife Resources GIS habitat maps have been used for this analysis and are located in the project file.

3.9.2.1 General Wildlife

Game species, small mammals, and the gray wolf are discussed below. Game species in the vicinity of the North Rich Allotment include mule deer (*Odocoileus hemionus hemionus*), elk (*Cervus elaphus nelsoni*), moose (*Alces americanus shirasi*), ruffed grouse (*Bonasa umbellus incana*), and blue grouse (*Dendragapus obscurus*). See Table 3.19 for estimated numbers of animals and population objectives in the Cache Harvest Unit for deer, elk, and moose.

Mule deer habitat within the North Rich Allotment consists of 980 acres of high value deer winter range along the eastern boarder of the allotment. While these high value acres are present, no critical winter range exists within the allotment. The entire allotment is mapped as summer range (minus the high value winter range). The amount of and quality of winter range on the Cache Harvest Unit is the limiting factor for deer. Mule deer populations on the Logan District have been below objectives since the crippling winter of 1992-93. During the winter of 2001-2002, a winter with extreme cold temperatures and above average snow depths on winter range, an estimated 50% of the deer herd died.

Elk habitat within the North Rich Allotment consist 102 acres of high value elk winter range along the northeastern border. No critical winter range exists within the North Rich Allotment. Nearly the entire allotment is mapped as elk summer range. Elk populations within the Cache Harvest Unit are currently stable and were not as greatly impacted by the winter of 1992-93 as were mule deer. Elk feed primarily on springtime grass and forb species until curing or loss of herbaceous material occurs, at which time diet's shift to a preponderance of deciduous browse species.

Moose numbers on the Logan District are currently stable after exceeding carrying capacity just prior to the winter of 1992-93 (Welsh 2002 pers. comm.). Numbers are currently near carrying capacity and within Utah Division of Wildlife Resources (UDWR) management objectives. Moose are yearlong residents moving little between summer and winter ranges. Their large body mass and long legs allow the need for only minor adjustments between summer and winter ranges. Habitat primarily used by moose includes riparian areas with plentiful willow browse, which occur in the southern portion of the allotment in Hells Hollow, and areas such as ridgelines with abundant mahogany shrubs, which occur in the northern portion of the allotment east of Middle Sinks.

Table 3.19 Estimated numbers of animals and population objectives in the Cache Harvest Unit for deer, elk, and moose.

Species	Population Objectives*	2003 Population Estimates*
Deer	25,000	12,800
Elk	2,300	1,950
Moose	180	185

* Data provided by Mike Welch, UDWR Wildlife Biologist (2003) Note: The Cache Harvest Unit is much larger than the North Rich Allotment, as shown in Figure 3.21.

Ruffed grouse numbers have been fairly stable over the Logan District for several years. They prefer thickets of mixed hardwood, including aspen, and conifers. These habitats occur throughout the North Rich Allotment. In Northern Utah birds display some seasonal differences in diet. Important summer forage items consist of insects, fruits, forb seeds, and plant tissues. Fall foraging centers on rose hips, aspen leaves, and chokecherries while winter diets are almost exclusively deciduous plant buds, in particular aspen buds. Ruffed grouse thrive best in young seral stage forests where understory forbs and shrubs flourish.

Blue grouse populations have been higher for the last few years. The blue grouse prefers subalpine habitats, which occur throughout much of the upper elevations of the allotment, foraging heavily on conifer needles and buds of shrubs. Habitat selection generally consists of dense herbaceous cover and sagebrush for nesting and dense insect rich herbaceous plants near riparian zones for brood rearing.

Numerous common species of small mammals also either occur or may occur within the North Rich Allotment as described below. In addition, because of its recent occurrence in northern Utah, the wolf is discussed as well.

Small mammals that occur or are likely to occur on the North Rich allotment include various squirrels, chipmunks, shrews, mice, voles, and gophers. Monitoring of small mammals in the allotment has been limited; therefore abundance or trends are largely unknown. From August 5-7, 2003, small mammals were captured as part of a sagebrush habitat study being conducted by Utah State University (personal communication between Beth Johnson and Steve Blatt). During these three days, 97 captures occurred within the South Sinks area. Table 3.20 displays the preliminary results from this trapping effort.

Table 3.20 Small mammal species and percentage of captures within sagebrush communities in the South Sinks area.

Species	Percent Captured
Deer Mouse	76
Unidentified Mouse*	9
Least Chipmunk	9
Great Basin Pocket Mouse	2
Golden Mantled Squirrel	1
Pocket Gopher	1
Unknown Mouse	1
Unknown Vole	1

* These are believed to be young deer mice. Note: The above data are from preliminary field notes. Additional analysis is being conducted for proper identification.

Ground squirrels are highly adaptable and use a variety of environments, mostly open non-forested areas with the exception of the golden-mantled squirrel, which uses open forests. Ground squirrels primarily use plant material for food. Chipmunks and tree squirrels primarily use seeds as food and are mostly more common in forested environments. Shrews are primarily

insectivores and usually are tied closely to moist habitats with higher amounts of vegetation cover such as riparian areas and meadows. Most mice use a variety of foods resources such as insects, seeds, and plant material and use a variety of habitat types. Voles primarily use plant material for food and usually are tied closely to moist habitats with higher amounts of vegetation cover such as riparian areas and meadows. Gophers use a variety of environments both forested and non-forest vegetation types. Gophers use plant material such as roots and tubers for food.

Gray wolf. Up until 2002, the last verified gray wolf taken within the State of Utah was in 1930. During the past several years, sightings of wolf-like animals have occurred in Utah. Many of these have been identified as wolf-dog hybrids (Utah Division of Wildlife Resources 2003). In 2002, a wolf from Yellowstone National Park was captured near the town of Morgan in northern Utah, southeast of Ogden. The animal was returned to Grand Teton National Park where it later rejoined its pack. In Utah, the gray wolf is not part of the US Fish and Wildlife Service experimental recovery effort being conducted in Wyoming, Idaho, and Montana. There has not been a breeding pair or a pack identified in Utah to date, only a dispersing animal. If wolves from the federal recovery areas enter Utah, they will receive protection under the Endangered Species Act. Wolves are not included in the list of threatened or endangered species for Rich or Cache County.

3.9.2.2 Management Indicator Species

Management indicator species (MIS) are species selected because changes in their numbers or extent are believed to indicate the effects of management activities on a range of species. One of the factors considered when selecting management indicator species (MIS) is their close tie to the communities they represent. The communities being monitored through MIS are where the majority of the Forest's management actions will take place. General guidance and criteria for selecting MIS are contained in 36 CFR 219.19(a) and in Forest Service Manual 2621.1.

Table 3.21 displays the wildlife species selected as Wasatch-Cache National Forest Management Indicator Species and their associated vegetation communities. In addition to these wildlife species, both Bonneville and Colorado cutthroat trout are defined as MIS for the Forest. For information regarding the Bonneville cutthroat trout see Section 3.2 in this document. The Oak-Maple and Sagebrush plant communities were identified in the revised forest plan (USDA Forest Service 2003) as indicator communities. While the Oak-Maple community does not occur in the project area, the Sagebrush community does. For information on the Sagebrush indicator community, see Section 3.7.2.4. As specified in the Revised Forest Plan, standard survey protocols are being developed for the beaver and the snowshoe hare. For more information on Forest MIS, see Appendix J in the Revised Forest Plan FEIS.

Table 3.21 Wasatch-Cache National Forest Wildlife Management Indicator Species

Wildlife Management Indicator Species	Associated Plant Community (Cover Type)
Goshawk (*Accipiter gentiles*)	Aspen, Conifer, Mixed Conifer
Snowshoe Hare (*Lepus americanus*)	Pole/Sapling Aspen, Conifer, and Mixed Conifer
Beaver (*Castor canadensis*)	Riparian

Northern goshawk – aspen, conifer and mixed conifer

The range of the northern goshawk is circumpolar. In the West it is found from Alaska through the Rocky Mountains to New Mexico. While all forested landscapes are used to some extent, certain forest cover types appear to be occupied by goshawks more than others (Graham et al. 1999). Cover types most often occupied by goshawks, based on sightings and nest locations, are Engelmann spruce, subalpine fir, lodgepole pine, and quaking aspen, in either single or mixed species forests. In addition to being a Management Indicator Species, the goshawk is also a Forest Service Sensitive species.

Within the North Rich Allotment there are four known territories. Table 3.22 displays the monitoring history for each of these territories. This table displays the years that monitoring began on each of these territories, although some territories were discovered prior to those dates. The number of known nests located within the each territory is: Territory A = 2 or 3 nests; Territory B = 6 nests; Territory C = 2 nests; and Territory D=1 nest.

Table 3.22 Goshawk territory history within the North Rich Allotment[1]

Territory	1995	1996	1997	1998	1999	2000	2001	2002	2003
A[2]	-	-	I	I	I	I	I	I	I
B[3]	O	O	X	X	X	X	I	OF2	OF3
C	-	I	I	I	I	O	I	I	I
D	-	-	-	-	-	-	-	-	OF1

[1]Abbreviations used in Table 3.22
- **O** - Occupied/Active
- **I** - Nest area inspected but Inactive
- **F** - The documented number fledged
- **X** - Not surveyed

[2]Nest locations are not within the allotment but foraging area overlaps into the allotment area.
[3]Most but not all nest locations occur within the allotment area.
Note: Nest Territory D was discovered in 2003.

Table 3.23 displays information regarding the status of goshawk nesting territories across the Ogden and Logan Ranger Districts. In general, the number of known territories has increased.

Table 3.23 Status (occupancy) of goshawk nesting territories across the Ogden and Logan Ranger Districts.

Year	1999	2000	2001	2002	2003
Number of Territories	7	8	11	11	14
Territories Monitored	7	8	11	11	11
Active Territories	2	4	4	6	6

Table 3.24 displays information regarding the status of goshawk nesting territories across the Forest. In general, numbers of known territories have increased. Percent of monitored territories found to be active has varied from a low of 23% in 2000 to a high of 48% in 2001. Average percent active during these years was 37 %.

Table 3.24 Status of goshawk nesting territories on the Wasatch-Cache National Forest

Year	1999	2000	2001	2002	2003
Number of Territories	29	31	34	35	45
Territories Monitored	20	31	23	33	41
Active Territories	7	7	11	14	16
% of Monitored Territories Active	.35	.23	.48	.42	.35

Three components of a goshawk's home range have been identified including the nest area (approximately 30 acres), post fledging-family area (approximately 420 acres), and foraging area (approximately 5,400 acres). Goshawks nest in a wide variety of forest types including aspen, coniferous, and mixed conifer forests. It typically nests in mature and old growth forests. The goshawk preys on large-to-medium-sized birds and mammals, which it captures on the ground, in trees, or in the air.

Snowshoe hare - pole/sapling aspen, conifer and mixed conifer

The snowshoe hare is a valuable prey species to the lynx, goshawk, and to other predators. In the Rocky Mountains and westward, hares mainly use coniferous forests in the higher mountainous areas. They are predominately associated with forests that have a well-developed understory that provides protection from predation and supplies them with food. Such habitat structure is common in early seral stages but may also occur in coniferous forests with mature but relatively open overstories (Ruggiero 2000). In summer, snowshoe hares eat forbs, grasses, leaves of shrubs, and some woody browse, while the winter diet is restricted to smaller-diameter twigs and some bark of shrubs and trees. In Alaska, for example, use of woody browse ranged from a high of 82% in winter, to 56% in spring, and 25% in summer (Wolff 1978).

In Utah, a study was done in the Bear River Range on the Wasatch-Cache National Forest where snowshoe hare densities were determined in different vegetation types (Wolfe 1980). Table 3.25 displays snowshoe hare use of specific cover types within the local area.

Table 3.25 Snowshoe hare density by vegetation cover type (Wolfe 1980)

Vegetation Type	Hares/Hectare
Subalpine Fir	0.99
Douglas Fir	0.57
Aspen dense understory	0.22
Aspen-conifer edge	0.17
Engelmann spruce	0.10
Aspen- sparse understory[1]	0.01

[1]This corresponds to the Aspen/Kentucky bluegrass and other grazing-induced (grazing disclimax) aspen community types (Mueggler 1988) described in Section 3.7.

Since 1998, Dennis Austin, Wildlife Biologist with the Utah Division of Wildlife Resources has been conducting snowshoe hare track and pellet survey transects in the Cache Harvest Unit. These surveys were conducted within the northern portion of Amazon Basin, which is north of the North Rich Allotment. Table 3.26 displays the results of his surveys.

Table 3.26 January and February snowshoe hare track counts and mean July snowshoe hare pellets counted per 100 m^2

Survey Type	1998	1999	2000	2001	2002	2003
January and February track counts	111	255	54	64	51	272
Mean July pellet counts per $100m^2$	--	94.0	29.5	98.8	562.9	785.3

As with other authors, Mr. Austin feels that the summer pellet counts are much more reliable than winter track counts. The large increase in the 2002 pellet counts coincides with an increase in hare population although it is too early to determine the cause.

As part of the Revised Forest Plan monitoring effort for Management Indicator Species, snowshoe hare grid plots were established across the forest in 2003. For the Logan Ranger District, 3 of the 7 grids occur within the North Rich Allotment Area. The three grids occur within the following vegetation types: mature lodgepole pine, young lodgepole pine, and mature mixed conifer. Each grid consists of 50 circular plots in which the number of snowshoe hare pellets is tallied on an annual basis. In 2003, each grid was cleared of all pellets. Counts for pellets will occur in 2004.

Beaver – Riparian

Beaver occur in permanent slow moving streams, ponds, small lakes, and reservoirs. Within the North Rich Allotment, aspen and willow are considered the primary preferred beaver woody-foods. Beaver play an important role in maintaining and enhancing riparian and aquatic ecosystems (Olsen and Hubert 1994) and are important for the creation of habitat for several species of fish, big game, waterfowl, and neotropical birds.

The North Rich Allotment was analyzed for the historic beaver activity with the use of aerial photographs taken in 1952, 1963, 1981, and 2001. This analysis was conducted to assess areas of beaver use and changes of use within the North Rich Allotment over time. The photo analysis indicates that beaver activities are limited to the southern portion of the allotment and are associated with Saddle Creek and its tributaries. No other areas of beaver presence within the allotment were evident from the photos.

It is evident from the photo analysis that beaver activity within the area has increased over the past years. This is likely due to a reduction of trapping related to changes in the fur industry. Wildlife has benefited from this increase in beaver activity through the creation and enhancement of wetland and riparian habitat. Most use areas continue to be active and occupied by beavers, as they were over the past 50 years. From the photo analysis, it appears aspen regeneration is lacking in beaver use areas. For more information regarding the aspen communities within these areas, see Section 3.7.2.1. For more information on beavers, see the wildlife biologist report on beaver activity, dated January 8, 2004, in the project file.

Field surveys conducted in 2001 documented the presence of beaver dams and ponds within the allotment area. Within the allotment there are eight distinctive locations of current beaver activity, consisting of both isolated and multi-colonies. A colony is typically about 5 to 6 beavers and consists of an adult pair, the young of the year, and young of the previous year. Hay (1958) described two types of colonies: isolated, which occurs on small tributaries and seepages and possess a defined periphery of beaver activities, and multi-colony, in which generations of beavers have occupied an area and no clear boundaries exist.

As part of the Revised Forest Plan monitoring effort for Management Indicator Species, beaver survey sections (square mile sections) have been identified across the forest. For the Logan Ranger District, 4 of the 32 survey sections occur within the North Rich Allotment. The survey sections will be monitored every 3 years to determine changes in beaver occupancy across the forest.

3.9.2.3 Threatened, Endangered, Proposed, and Candidate Species

The U.S. Fish and Wildlife Services lists two Threatened, one Endangered Species, and one Candidate species as occurring, or potentially occurring, in Cache and/or Rich County, Utah. These include the bald eagle (T), Canada lynx (T), black-footed ferret (E) (Rich County only), and the Yellow-billed cuckoo (C) (Cache County only).

Canada lynx

The Canada lynx occurs across the boreal forests of Canada and Alaska in association with snowshoe hare habitat or habitat of other suitable prey species. They have also been found in isolated spruce, fir, and lodgepole pine forests of Washington, Idaho, Montana, Wyoming, and Colorado. Early successional stands with high densities of shrubs and seedlings are optimal for hares, and subsequently important for lynx. Mature forest stands are used for denning, cover for kittens, as well as travel corridors. Home ranges of lynx are generally 6-8 square miles, but range from 5-94 square miles. Males have larger ranges than females. Overlapping ranges do occur, mainly among animals of different sex and age classes. Adult lynx of the same sex tend to keep exclusive home ranges. Density of lynx in an area is highly dependent on prey (snowshoe hare) abundance. Most densities range from one lynx per 6-10 square miles.

On July 3, 2003, the U.S. Fish and Wildlife Service issued a Notice of Remanded Determination of Status for the contiguous United States distinct population segment of the Canada Lynx (USDI 2003). The notice states that there is no evidence of lynx reproduction in Utah and that lynx, which occur in Utah, are dispersers rather than residents.

Reports of lynx in Utah indicate sightings between 1961 and 1982 on the Ashley and Wasatch-Cache National Forests, but no sightings between 1983 and 1993 (USDA Forest Service 1994). In Utah, Engelmann spruce, white fir, subalpine fir, and lodgepole pine forests at the higher elevations, 7,300 to 10,500 feet (2,250 – 3,250 m) are the primary vegetation cover types that may contribute to lynx habitat. Habitat for Canada lynx occurs within the project area, primarily in the conifer cover types dominated by various combinations of lodgepole pine, Douglas-fir, subalpine fir, and Engelmann spruce interspersed with the aspen cover type. The Bear River Range on the Wasatch-Cache National Forest has been classified as lynx linkage

habitat (USDA Forest Service 2003) within the north-south wildlife corridor (Figure 3.21). Prey habitat (conifer and aspen communities with forage in the understory) for snowshoe hare, the primary prey for lynx, also occurs in the project area.

As noted above, lynx are generally found in association with snowshoe hare habitat. Quaking aspen dominates much of the landscape, but snowshoe hares may use aspen stands much less than conifer stands in this area (Wolfe et al. 1982), probably because they lack dense overstory cover (Hodges 2000a). Where they are intermixed with spruce-fir and lodgepole pine stands, aspen stands would constitute secondary vegetation that may contribute to lynx habitat (Ruediger et al. 2002).

Maintaining connectivity with Canada and between mountain ranges is an important consideration for the Northern Rocky Mountains Geographic Area (Ruediger et al. 2002). It is likely that the Northern Rocky Mountains Geographic Area and the Southern Rocky Mountains Geographic Area of Colorado and southern Wyoming are poorly connected. Shrub-steppe communities in central and southern Idaho, Wyoming, southeast Montana, and eastern Oregon may provide connectivity between adjacent mountain ranges. Along the Continental Divide, they may also provide an important north-south link between large patches of lynx habitat.

Numerous lynx records occur in Idaho and within the Uinta Mountains of Utah. The North Rich Allotment lies within what is thought of as a “travel corridor” between these two larger habitats areas and less of as permanent resident habitat. In a letter from the USFWS dated November 6, 2002, lynx habitat within the North Rich Allotment was reclassified from Lynx Analysis Unit (LAU) to linkage area due to a low percentage of primary habitat (letter available in the project file).

Figure 3.23 displays lynx primary and secondary habitat for the Logan and Ogden Ranger Districts of the Wasatch-Cache National Forest. Table 3.27 displays the percentage and number of acres of primary and secondary habitat that occurs on USFS lands and within the North Rich Allotment. Primary habitat within the North Rich allotment consists of 20 % and 11 % of the total primary habitat within the Logan District and within the Ogden/Logan Districts, respectively. Secondary habitat within the North Rich Allotment consists of 14 % and 10 % of the total secondary habitat within the Logan District and within the Ogden/Logan Districts, respectively. Figure 3.24 displays lynx primary and secondary habitat within the North Rich Allotment.

Table 3.27 Acres and percent of lynx habitat on the Logan and Ogden Ranger Districts and the North Rich Allotment

Location	Total Acres	Primary Habitat	Percentage	Secondary Habitat	Percentage
Logan & Ogden Districts	436,343	45,157	10	161,512	37
Logan District	274,810	24,182	9	110,133	40
North Rich Allotment	27,489	4,922	18	15,890	58

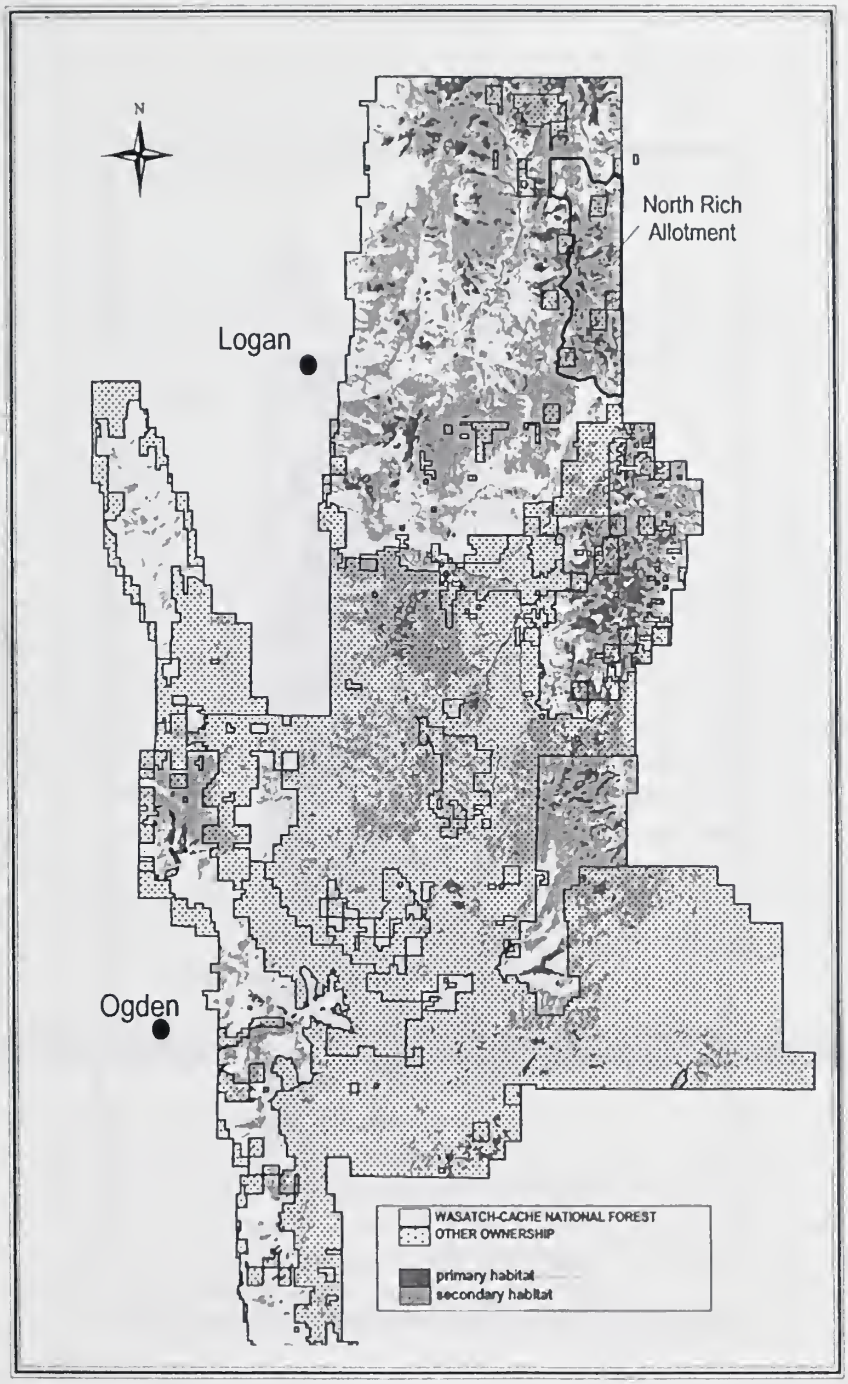


Figure 3.23 Lynx primary and secondary habitat on the Logan and Ogden Ranger Districts of the Wasatch-Cache National Forest

Based on the location of primary and secondary habitat and the connectivity of habitat the most direct connection linking primary and secondary habitat within the two Ranger Districts would pass through the allotment area from the central western portion of the allotment and include the southern part of the allotment; thus connecting the northern portion of the Logan Ranger District with areas to the south on the Ogden District (Curtis Creek Area and Monte Cristo Range).

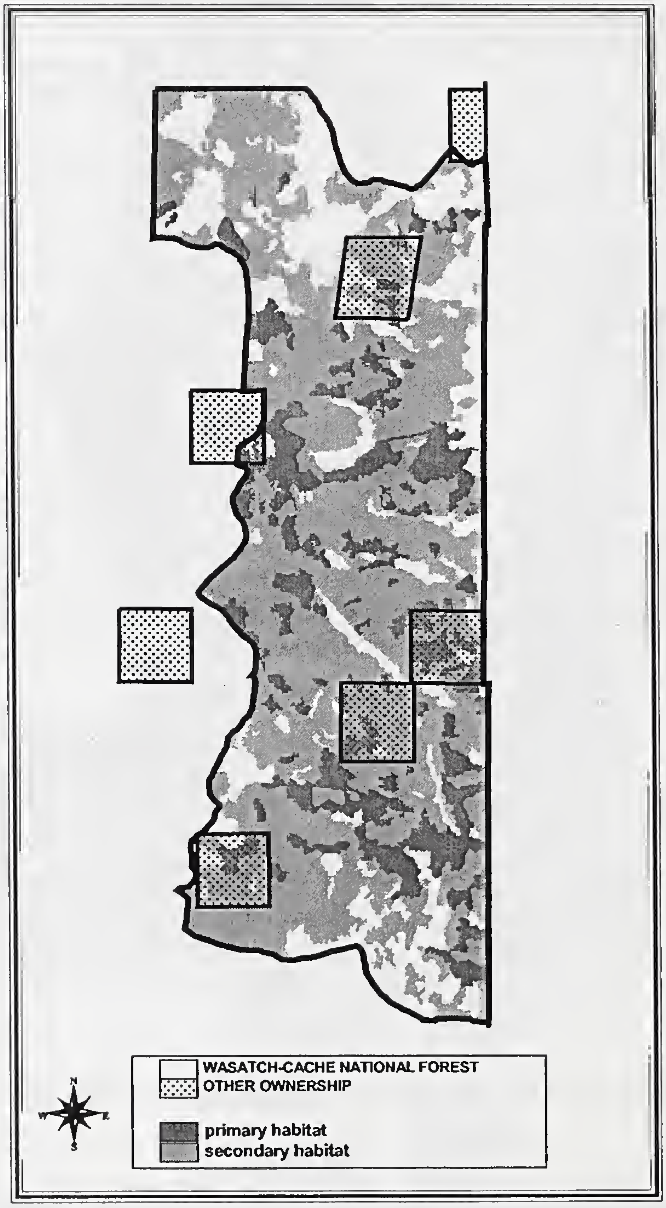


Figure 3.24 Lynx primary and secondary habitat within the North Rich Allotment.

In 1999-2001, lynx hair snares were established throughout Utah and other western states. No lynx hair samples occurred in northern Utah during this effort. One of the Utah hair snare grids is located within the North Rich Allotment.

Bald eagles

Bald eagles are winter visitors, for the most part, to Utah and tend to congregate wherever food is available, often near open water where fish and waterfowl can be caught. Occasionally, individual bald eagles may pass through the area, but are not likely to concentrate because feeding habitats do not occur within the North Rich Allotment.

Black-footed ferrets

Black-footed ferrets are a prairie species almost entirely obligate on prairie dog towns for food and shelter. Portions of Rich County are considered to be historic range for black-footed ferret The National Forest is probably on the very edge of this range, if included at all. None are expected to occur within the allotment.

Yellow-billed cuckoos

The current distribution of yellow-billed cuckoos (*Coccyzus americanus*) in Utah is poorly understood, though they appear to be an extremely rare breeder in lowland riparian habitats statewide. Historically, cuckoos were probably common to uncommon summer residents in Utah and across the Great Basin (Parrish et al. 2002). No records of occurrence of this species exist for the project area. Nesting habitat is classified as dense lowland riparian characterized by a dense sub-canopy or shrub layer (regenerating canopy trees, willows, or other riparian shrubs) within 100 m (333 ft) of water. Overstory in these habitats may be large, gallery-forming trees, 33 to 90 feet (10-27 m) in height or developing trees 10 to 27 feet (3-10 m) in height, usually cottonwoods. Nesting habitats are found at elevations below 6,000 ft. (1820 m). Cuckoos may require large tracts of contiguous riparian nesting habitat between 100 and 200 acres (40-80 ha). However, cuckoos are not strongly territorial and home ranges may overlap during the breeding season (Parrish et al. 2002). No habitats that meet these characteristics occur or likely occurred on the North Rich Allotment and no records of occurrence of this species exist for the allotment.

3.9.2.4 Forest Service Intermountain Region Sensitive Species

Sensitive species are defined as "Plant and animal species, selected by the Regional Forester, for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, and significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution" (USDA Forest Service 2003). Of those species listed as sensitive for the Wasatch-Cache NF, only the following occur in or in the vicinity of the North Rich Allotment: the wolverine, boreal owl, flammulated owl, northern goshawk, three-toed woodpecker, and the Townsend's big-eared bat. The peregrine falcon was recently identified as a Forest Service sensitive species after the U.S. Fish and Wildlife Service removed it from endangered status.

Detailed habitat requirements and general distribution information for all sensitive species on the Wasatch-Cache National Forest are discussed in the Revised Forest Plan (USDA Forest Service 2003).

Northern goshawk are also Management Indicator Species for the Forest and are described in detail in Section 3.9.2.2.

Peregrine falcons occupy a wide range of habitats and are usually found in open country near water. There are no known peregrine falcon nests in the North Rich Allotment. They prefer cliffs or other similar structures for their nesting habitat. Nesting on the Forest occurs in rugged canyons on cliff faces. This type of habitat is lacking within the North Rich Allotment.

Boreal owls have a range that is circumboreal. In North America, it breeds from Alaska east across Canada, and south into the mountains of Washington, Idaho, Montana, Wyoming, and Colorado. Boreal owls are closely associated with high elevation spruce-fir forests because of their dependence on this forest type for foraging year round. Nesting habitat structure consists of forests with a relatively high density of large trees (12 inch dbh), open understory, and multi-layered canopy. Owls nest in cavities excavated by large woodpeckers in mixed conifer, aspen, Douglas-fir, and spruce-fir stands. In winter, they may move down in elevation and roost in protected forested areas. Boreal owls avoid open areas, such as clearcuts and open meadows, except for occasional use of the edges of openings for foraging.

Boreal owls have responded to taped calls in northern Utah in 2-3 locations on the Ashley, Uinta, and Wasatch-Cache National Forests. The Wasatch-Cache NF observation/responses have been concentrated along the Rich and Cache County line on the Logan Ranger District (inside and outside of the allotment). Nests locations have not been found. In 2001, on the Uinta National Forest, a nesting boreal owl was located; this being the first documented nesting of a boreal owl in Utah (Mika 2000 pers. comm.). During the winter/spring of 2001 and 2002 broadcast calling surveys were conducted within the allotment area and within areas with past responses. No responses were heard during these surveys (field data available in the project file).

Great gray owls breed from the boreal forests of Alaska, east to Ontario, and south to northeastern Minnesota, northwestern Wyoming, western Montana, Idaho, and through the Sierra Nevada Mountains of California and Nevada. Great gray owls use mixed coniferous and hardwood forests usually bordering small openings or meadows. They forage along edges of clearings. Semi-open areas, where small rodents are abundant, near dense coniferous forests, for roosting and nesting, are optimum habitat for great gray owls. During winter some birds stay on or near their breeding territories and others make irregular movements in search of prey and favorable snow conditions. In the Intermountain Region, great gray owls occur primarily in lodgepole pine/Douglas-fir/aspen zone and in ponderosa pine. There have been sightings of great gray owls on the Wasatch-Cache National Forest and on the Ashley National Forest. In general, it is felt that these winter vagrants only occasionally visit Utah.

Greater sage grouse were added to the Intermountain Region Sensitive Species list on November 17, 2003. Recent research has documented population declines of this species and identified concerns over the amount and quality of its habitats (letter on file in the project record). Sage grouse prefer tall, dense sagebrush-dominated ecosystems, associated with deep soils. This habitat does not occur within the project area, but occurs at lower elevations to the east. Surveys for the sage grouse have been conducted by UDWR for several years, primarily

centered on locating leks and conducting population counts at lek sites. No leks occur within the North Rich Allotment area.

Pygmy rabbits were also added to the Intermountain Region Sensitive Species list on November 17, 2003, for the same reasons listed under the greater sage grouse. Pygmy rabbits prefer habitats of dense, tall stands of sagebrush associated with deep soils. The pygmy rabbit is not known to occur within the North Rich Allotment.

A winter survey (January 15, 2004) was conducted to determine the presence or absence of pygmy rabbits within the sagebrush habitats in South Sinks, Peter Sinks, Middle Sinks, and the area southwest of South Sinks. Neither pygmy rabbits nor their sign were observed during the survey. Coyote, fox, snowshoe hare, squirrel, and weasel tracks and den entrances were observed. Within the area surveyed, the amount of sagebrush exposed above the snow was very limited. Snow depths were about three feet except for windswept slopes. Snow depths in the area likely preclude use by pigmy rabbits.

According to Dennis Austin (UDWR wildlife biologist), pygmy rabbits do not occur within Strawberry Valley, the area just to the south of the North Rich Allotment with similar sagebrush habitats (personal communication, December 2003).

The pygmy rabbit is known to occur at lower elevations in the tall sagebrush habitats to the east near Bear Lake (Janson 2002).

Wolverines are a circumboreal species. In North America, they occur in Alaska and across the boreal forests of Canada south into Washington, Oregon, Idaho, Montana and Wyoming. They also occur in backcountry areas of California, Colorado, and northern Minnesota. Recent data searches (USDA Forest Service 1994a) indicate that no wolverines were sighted in Utah between 1961 and 1983, but there were sightings between 1983 and 1993, on the Ashley and Wasatch-Cache National Forests. A 1995 survey conducted in Franklin Basin did not produce any tracks or photographic evidence of wolverines (Bissonette et al. 1995). On March 29, 2002 a helicopter survey for wolverine conducted by the Caribou National Forest identified probable wolverine tracks just south of the Idaho/Utah state line (outside of the North Rich Allotment) (USDA Forest Service 2002a). There have been unconfirmed sightings elsewhere on the Wasatch-Cache National Forest.

Townsend's big-eared bats occur throughout western North America, from British Columbia to southern Mexico, and east to South Dakota and western Texas and Oklahoma. Isolated populations exist in southern Missouri, northwestern Arkansas, northeastern Oklahoma, eastern Kentucky, West Virginia, and western Virginia. They are widely distributed throughout the Intermountain Region. The species have been identified in Bat Cave on the Ogden District and in Logan Cave on the Logan District. They may exist in other areas of the Forest where there is suitable roosting habitat. Western big-eared bats use juniper/pine forests, shrub/steppe grasslands, deciduous forests, and mixed coniferous forests from sea level to 10,000 feet. During winter they roost singly or in small clusters in caves, or rocky outcroppings, occasionally in old buildings, or mine shafts. These winter habitats are not present in the North Rich Allotment.

Flammulated owls breed from southern British Columbia south to Veracruz, Mexico and from the Rocky Mountains to the Pacific. Their winter range is thought to extend from central Mexico to Guatemala and El Salvador. Flammulated owls are a migratory species that occur in mixed conifer forest with spruce and fir at higher elevations and have also been found in aspen communities. They prefer ponderosa pine-Douglas-fir forests with open canopies. Large diameter (>20 inch dbh) dead trees with cavities at least as large as northern flicker cavities are important site characteristics. Territory size varies from 20 to 59 acres and is determined by age and patchiness of overstory trees. Flammulated owls are present on the Wasatch-Cache National Forest and appear to be fairly well distributed.

Habitat for flammulated owls occurs within the North Rich Allotment. Responses to tape recorded call surveys within the allotment area also suggest that flammulated owls are fairly well distributed within the forested portions of the allotment. Current studies have focused on disturbance and feeding habits in two primary but separate populations, which use the aspen vegetation community type on the Ogden Ranger District (Mika 2000, Mika 2001, Mika 2003, and McCabe 2002). Results of these studies show rather high hatching and fledging success.

Three-toed woodpeckers range across North America from tree line south to southern Oregon and through Idaho and Utah to New Mexico and Arizona. In eastern North America, they are found south to Minnesota, southern Ontario, New York, and northern New England. They also occur across northern Europe and Asia. Threats to the three-toed woodpecker are timber harvest and loss of snags (NatureServe 2001). They are found in northern coniferous and mixed forest types up to 9,000 feet. Nests may be found in spruce, tamarack, pine, cedar, and aspen trees. Loose and Anderson (1995) found that 91% of woodpecker nests in mixed conifer were in mature aspen trees (dbh 7 inches or larger) (Hill 2000). They forage on insects (e.g. spruce bark beetle), which use a wide variety of tree species depending on location. They stay on their territories year round, though insect outbreaks may cause irregular movements. Three-toed woodpeckers are found in many areas of the Ashley, Uinta and Wasatch-Cache National Forests and habitat for these species occurs throughout the North Rich Allotment.

3.9.2.5 Neotropical Migratory Birds

Five US Forest Service breeding bird survey routes (primarily Neotropical migrants) have been established within or adjacent to the North Rich Allotment. These are located within Hell's Hollow, Jebo Canyon, Little Bear Road, Log Cabin Road, and along the Sink's Road. Survey results are displayed in Appendix E. Three surveys have been completed on the Hell's Hollow route, two surveys have been completed on the Log Cabin and Sinks Road routes, and a single survey has been completed on the Jebo Canyon and Little Bear routes. In 2002, the Hells Hollow route had the greatest species diversity of each of these sites, which had increased by 11 species since the 1999 survey. These surveys found that the dark-eyed junco, pine siskin, and hermit thrush were the most often found species. The American robin, ruby-crowned kinglet, mountain chickadee and western tanager were also commonly found.

Priority migratory bird species that occur within the Wasatch-Cache National Forest identified in the Utah Bird Conservation Plan (Utah Partners in Flight 2002) have been identified as

species at risk in the Revised Forest Plan (see Forest Plan FEIS, Appendix B-2). Of those species, only the Brewer's sparrow and the broad-tailed hummingbird occur at modest numbers within the North Rich Allotment.

From 1996 to 2002, 89 observations of the Brewer's sparrow have been made on the Forest Service neotropical bird transects on the Ogden and Logan Ranger Districts, of which 13 have occurred within the analysis area. Of these sighting most are associated with sagebrush habitats (see project file for survey results).

From 1996 to 2002, 156 observations of the broad-tailed hummingbird have been made on the Forest Service neotropical bird transects on the Ogden and Logan Ranger Districts, of which 20 have occurred within the analysis area. Of these sighting most are associated with aspen or riparian habitats (see project file for survey results).

Additional Forest Service breeding bird survey data (21 additional routes) for the Ogden and Logan Ranger Districts are available in the project files and summarized for all routes completed through 2002. Additional data summarized within the project file include observations conducted by Dennis Austin, UDWR wildlife biologist, from survey routes in Logan Canyon, Hardware Ranch, Red Spur Mountain, Ant Flat-Ogden Canyon, and State Road #39 in Rich County.

3.9.2.6 Species at Risk

Species at risk have been identified in the Revised Forest Plan as "federally listed endangered, threatened, candidate, and proposed and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk may include sensitive species and state listed species."

As the Plan explains, legal mandates and regulations (i.e. Endangered Species Act) and policy (i.e. sensitive species management) will continue as separate processes for threatened, endangered, and sensitive (TES) species listed under species at risk. These require analysis for any project implemented under the Revised Forest Plan to ensure that negative effects are avoided and viability is provided for these species. MIS species are also considered in project specific analyses. Species with federal status (i.e. endangered, threatened, candidate, proposed, and USFS sensitive species) are addressed elsewhere in this document under their respective categories. Species not specifically addressed through implementation and monitoring for TES or MIS will be managed opportunistically. By managing within the range of historic variation and properly functioning conditions it is expected that these species will be sustained in the long term. For additional information see Appendix F in this documents and the Wasatch-Cache National Forest Final Environmental Impact Statement (USDA Forest Service 2003) Appendix B-2: Terrestrial Wildlife Diversity and Viability.

Chapter 4
The Environmental Effects

4.1 Introduction

This chapter provides a summary of the environmental effects on the physical, biological, and social-economic components of the North Rich Allotment. The information is provided by resource/discipline in the same order as Chapter 1 (Issues) and Chapter 3 (Affected Environment).

4.2 Effects on Aquatic and Semi Aquatic Species

4.2.1 Introduction

This section describes the effects on aquatic species that could result from grazing the North Rich Allotment under different alternatives. Estimating the effects to aquatic habitat and aquatic species by alternative is based upon an understanding of current and past watershed conditions and an estimate of when and to what degree watershed restoration is expected based upon actions taken for each alterative.

Aquatic resources in the North Rich Allotment consist largely of ephemeral and intermittent streams and a few perennial streams. In addition, there are many seeps and ponds (see Water and Soils Affected Environment, Section 3.8). Bonneville cutthroat trout within the North Rich Allotment are limited to less than one mile of stream in the headwaters of Saddle Creek (within the Hells Hollow exclosure). Boreal toads have been found only in Tin Cup Spring (see Figures 3.1 and 3.2). These areas will be the primary focus of this analysis, although other species are briefly addressed.

4.2.2 Issues Addressed

Public and agency scoping, followed by Forest Service interdisciplinary team review identified the following issues to be addressed in this impact analysis:

- How would cattle grazing under the proposed action or any of the alternatives affect aquatic habitat and aquatic and semi-aquatic species found to exist within the waters of the North Rich Allotment?

- How would cattle grazing affect Bonneville cutthroat trout populations and how can the provisions of the Conservation Agreement and Strategy for the Bonneville cutthroat trout be carried out?

Measurement indicators used to compare alternatives:

a. The degree to which aquatic habitat is provided or protected through restoration of degraded riparian areas.

b. The extent of protection afforded to Bonneville cutthroat trout populations.

4.2.3 Effects Analysis Methods and Assumptions

Baseline conditions were determined through review of literature and field observations. Field observations were conducted to identify and quantify fish, amphibian, and invertebrate populations, and to characterize habitat conditions in the North Rich Allotment. To compare the environmental effects by alternative it was necessary to make the following assumptions.

- Stubble height and utilization thresholds are not exceeded (through effective permit administration)
- Improvements, fences, and off-channel water developments are constructed on schedule and maintained to standard
- Livestock are encouraged to use suitable uplands through offsite watering, strategic salting, and intensive riding.

4.2.4 Direct and Indirect Effects

Cattle are attracted to riparian areas because of the drinking water, shade, relatively gentle topography, and vegetation that remains green long after upland areas (Roath and Krueger 1982b, Platts and Nelson 1985, Armour et al. 1994, Fleischner 1994, Belsky et al. 1999). Cattle grazing in these riparian areas have numerous direct and indirect effects on aquatic species including: reductions in abundance, habitat, and diversity (Platts and Nelson 1985, Belsky et al. 1999, Rinne 1999). To reduce or eliminate both direct and indirect effects to aquatic species several grazing strategies have been developed and are considered within the three alternatives in this analysis. They include: riparian fencing, rest rotation, deferred rotation, and cattle removal. Grazing prescriptions such as rest-rotation and deferred rotation have fair stream rehabilitation potential (Platts 1991). A more complete discussion of direct and indirect effects of grazing on riparian areas and fish species is available in the project file.

4.2.4.1 Alternative A (No Action - Current Management)

Boreal toad. For boreal toad, whose preferred reproductive habitats are shallow, organic/silt dominated ponds and wetlands, egg masses, tadpoles and metamorphs lack the ability to flee large mammals and are relatively susceptible to trampling mortality. The probability of such mortality varies with the accessibility of habitats used by

vulnerable life stages and the potential temporal overlap in grazing previous to maturation and movement. In North Rich, boreal toads are likely restricted to Tin Cup Spring, which has been impacted by livestock grazing (see Figure 3-1). Riparian fencing was constructed around Tin-Cup Spring during the summer of 2003 and will reduce the direct and indirect effects (trampling, removal of vegetation, sediment input) of livestock grazing on individuals and the population of boreal toad. An existing watering trough was relocated outside the exclosure to provide water for livestock. Since adult boreal toads are known to travel up to three miles from water, there would still be some potential for trampling mortality outside the exclosure. However, this would be unlikely due to the boreal toad's ability to avoid large ungulates.

Other aquatic and semi aquatic species. Individuals and populations of tiger salamander and aquatic invertebrates in the project area outside the protection of the exclosures would continue to be influenced by grazing impacts under Alternative A. Loss of riparian vegetation cover due to cattle consumption and trampling and stream bank erosion would continue. One benefit to continued grazing is that stock ponds that continue to be maintained would provide habitat for amphibians.

Bonneville cutthroat trout. Bonneville cutthroat trout (BCT) within the North Rich Allotment are limited to less than one mile of stream in the headwaters of Saddle Creek (within the Hells Hollow exclosure). Conclusions drawn from a 2000 stream survey found that this population of BCT was at high risk of extirpation. This was based upon the small population size, isolation in a small headwater stream, missing year classes, and presence of non-native brook trout. The Hells Hollow exclosure was constructed in 1993. Stream channel measurements taken in 2000 indicate habitat conditions have improved since 1992. Alternative A would result in maintaining current habitat conditions. The existing Hells Hollow exclosure would be maintained to prevent cattle from trampling stream banks, removing streamside vegetation, while providing a buffer for the stream. This exclosure will continue to protect the population of BCT in the North Rich Allotment (the entire population is contained within the exclosure). Therefore, selection of Alternative A is not likely to impact individuals or habitat in Saddle Creek, although the risk of loss from factors other than grazing (as listed above) remains. If the Hells Hollow exclosure is not maintained and cattle are allowed to graze this area it would exacerbate the existing problems and would likely contribute to the removal of this population.

4.2.4.2 Alternative B (Proposed Action)

Boreal toad. Direct and indirect effects to boreal toad (which have been found only around Tin-Cup Spring) would be similar to those described in Alternative A because this area has been fenced. In areas outside the exclosure, vegetation conditions should improve due to the reduction in cattle numbers and the implementation of a rest rotation grazing system. In years that the southern pasture is rested there would be a reduced chance of mortality from trampling outside the exclosure, although the potential for trampling is unlikely due to the toads' ability to avoid large ungulates.

Other aquatic and semi aquatic species. Implementation of Alternative B would result in maintaining or improving current habitat conditions based on a reduction in grazing, a rest-rotation grazing system, and additional riparian fencing in Hells Hollow and Mill Hollow. As fencing is installed, direct and indirect effects would be reduced for tiger salamanders and aquatic invertebrates in these respective areas. Individuals and populations of tiger salamander and aquatic invertebrates outside the protection of the exclosures would continue to be influenced by cattle grazing under this alternative. However, the magnitude of these impacts would be considerably less than impacts under Alternative A due to the reduction in cattle numbers and implementation of a rest rotation grazing system.

Bonneville cutthroat trout. Alternative B, like Alternative A, is not likely to impact Bonneville cutthroat trout individuals or habitat because of the protection afforded by the Hells Hollow exclosure. The risk of loss from factors other than grazing (as listed above) remains. Like alternative A, if the Hells Hollow exclosure is not maintained and cattle are allowed to graze this area it would exacerbate the existing problems and would likely contribute to the removal of this population.

4.2.4.3 Alternative C (No Grazing)

Boreal toad and other aquatic and semi aquatic species. Direct and indirect effects to boreal toad, tiger salamanders, and aquatic invertebrates would be similar to Alternative A for the first three years. Once cattle were removed from the allotment, impacts to individuals/populations of boreal toad, tiger salamanders, and aquatic invertebrates from livestock grazing would no longer occur. However, stock ponds would no longer be maintained and the amount of still water habitat available would be reduced over time. Trespass of cattle from adjacent allotments could occur but the extent is undetermined.

Bonneville cutthroat trout. Alternative C would maintain current habitat conditions for the first three years in areas outside of the Hells Hollow exclosure. After three years, areas outside exclosure would improve based on the removal of cattle from the allotment. Habitat conditions within the exclosure will remain unchanged. Additionally, without livestock grazing in North Rich, a fence to exclude livestock from Saddle Creek would be unnecessary, and would result in the removal of approximately two miles of fence. Alternative C is not likely to impact individuals or habitat in Saddle Creek, although a high risk of loss from factors other than grazing would remain.

4.2.4.4 Alternative D (Two Pasture, Deferred Rotation)

Boreal toad. Direct and indirect effects to boreal toad around Tin-Cup Spring would be similar to those described in Alternative A. In areas outside the exclosures, vegetation conditions should improve during periods of nonuse. As in the other alternatives, when cattle are in the vicinity of Tin-Cup Spring there would be a chance of mortality from trampling outside the exclosure, although this is unlikely due to the boreal toads' ability to avoid large ungulates.

Other aquatic and semi aquatic species. Implementation of Alternative D would result in maintaining or improving current habitat conditions based on a deferred rotation grazing system, and additional riparian fencing in Hells Hollow and Mill Hollow. As riparian fencing is installed, direct and indirect effects would be reduced for tiger salamanders and aquatic invertebrates in these respective areas. Individuals and populations of tiger salamander and aquatic invertebrates outside the protection of the exclosures would continue to be influenced by cattle grazing under this alternative. Loss of riparian vegetation cover due to cattle consumption and trampling and stream bank erosion would continue. With the implementation of a two pasture deferred rotation grazing system, herding should be more effective since riders only have to cover half as much territory.

Bonneville cutthroat trout. Alternative D, like the other Alternatives, is not likely to impact Bonneville cutthroat trout individuals or habitat because of the protection afforded by the Hells Hollow exclosure. The risk of loss from factors other than grazing (as listed in Alternative A) remains. Like alternatives A and B, if the Hells Hollow exclosure is not maintained and cattle are allowed to graze this area it would exacerbate the existing problems and would likely contribute to the removal of this population.

4.2.5 Mitigation

No additional mitigation is required for the protection of aquatic resources since items such as riparian fencing, stubble height and utilization requirements, and rest/rotation used to mitigate effects to aquatic species are incorporated into the proposed action and the alternatives.

4.2.6 Unavoidable Adverse Effects

With the implementation of riparian fencing and utilization standards and guidelines, no unavoidable impacts to aquatic and semi aquatic species are expected.

4.2.7 Short-term Uses vs. Long-term Productivity

With the implementation of riparian fencing and utilization standards and guidelines, no long-term effects to the aquatic and semi aquatic species are expected.

4.2.8 Irreversible and Irretrievable Commitments

There will be no irreversible/irretrievable commitments of aquatic or semi aquatic resources with implementation of the proposed action or the alternatives as long as exclosure fences are maintained.

4.2.9 Cumulative Effects

Area of Influence

The area of influence for the cumulative effects analysis for aquatics is the immediate area where grazing is taking place. Although the North Rich allotment is at the head of three different watersheds (Bear Lake, Logan River, and Blacksmith Fork), it has little influence on any of them because there are no perennial flows to fish bearing streams or lakes outside the allotment and there are limited flows within the allotment.

Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action

Certain natural processes outside the influence of the Forest Service have the potential to result in cumulative effects to aquatic resources, both negative and positive, across land ownership boundaries. It is difficult to predict effects to aquatic resources over the short- or long-term, whether direct, indirect, or cumulative, due to natural processes that operate on aquatic resources at this spatial scale (drought, wildfire, and flood).

Existing conditions are the result of past and ongoing management activities such as forest roads, fisheries management, forest and rangeland management, as well as the natural processes discussed above. The interdisciplinary team identified past, present, and future ground disturbing activities (see Appendix J). Given the nature of these activities, the primary cumulative impacts to aquatic habitat and aquatic/semi-aquatic populations can be summarized into the following categories:

- Historical and current livestock grazing
- Past, present and future roads and trails management
- Aquatic management (fishing, non-native fish introductions, boreal toad collecting)
- Timber harvest
- Fire (prescribed, suppression of natural and human-caused fire)
- Riparian fencing

Grazing

Livestock grazing records on the North Rich Allotment indicate that the number of cattle in the 1920's were twice the number of cattle today. In addition, 3-5,000 sheep were grazed in this area. Cattle and sheep numbers were even higher than this at the turn of the century. High numbers of animals grazing within the North Rich Allotment had effects on Saddle Creek and other streams in the area including reduced stream productivity from bank erosion, high sediment delivery, decreased pool frequency, decreased pool depth and size, increased width to depth ratios, and likely an increase in water temperatures. Since 1993 when the Hells Hollow exclosure was constructed habitat conditions have been improving.

It is likely boreal toad were found near most springs and streams within the North Rich Allotment based upon historic collection sites (Hogrefe 2002). Although the creation of stock ponds has increased the amount of habitat available to boreal toads, they have also attracted livestock. Cattle have likely contributed to the reduction in overall boreal toad numbers through crushing of eggs, tadpoles, and metamorphs, and by removing aquatic vegetation needed for spawning success.

Road and Trail Management
Erosion can be expected from roads and trails that are not adequately maintained. Roads also provide access, and the activities that accompany access, and magnify their negative effects on aquatic habitats. Activities associated with roads within the analysis area include recreation, timber harvest, livestock grazing, prescribed fire, and fire suppression. In addition, roads provide an avenue for stocking non-native fish.

Aquatic Management
Impacts to the Bonneville cutthroat trout within the North Rich Allotment from angling are limited. No anglers have been observed fishing upper Saddle Creek. A bigger concern is the introduction of brook trout. Brook trout were stocked in Left Hand Fork of Blacksmiths Fork in the 1930's and may have immigrated to upper Saddle Creek during high flows. It is also possible that brook trout were illegally moved to this site. Brook trout are known to negatively affect BCT populations indirectly through competition for food and space, and directly through predation.

Boreal toads are slow-moving and easy to catch. The public recently removed several from populations near Strawberry Reservoir. This is an illegal activity and can have dramatic effects on small populations. There have been no known removals from the North Rich Allotment area.

Timber Harvest
Riparian habitat conservation areas (RHCA) are used to protect riparian areas within harvest units. No timber harvesting has occurred or is planned within Saddle Creek drainage or near Tin-Cup Spring. It is unlikely that timber harvest has had any effect on the population of BCT in upper Saddle Creek.

Fire
No known wildfires have occurred in the upper Saddle Creek drainage or near Tin Cup Spring. No prescribed burns are planned in these areas. This area is not currently covered by a wildland fire use plan, which means any ignition in the area would be suppressed. Effects of fire are difficult to predict due to the variation inherent to wildfires (intensity, size, location). It is possible the short-term rates of erosion and sediment delivery after a fire would be large enough to extirpate the population of Bonneville cutthroat trout in upper Saddle Creek. Fire effects to vegetation and watersheds influencing hydrologic and temperature regimes and erosion may persist for years. Bonneville cutthroat trout populations have evolved with fire, and have developed characteristics that provide for resilience in the face of such events. However, they likely

depend on large, well connected, and spatially complex habitats, and these are not available within the North Rich Allotment.

Riparian Fencing

Three riparian fencing projects are planned or have been completed within the North Rich Allotment under a Decision Memo signed by District Ranger Rob Cruz on June 2, 2003. The Tin Cup Spring riparian fence was completed in fall 2003. It was designed to protect Tin Cup Spring and the boreal toad population there. Its effects are described in 4.2.4.4. The second project is planned for Jebo Springs. This project should improve conditions at the spring and provide additional habitat for tiger salamanders and aquatic invertebrates. The final project is underway at Mill Hollow Springs. This project should improve water quality and riparian conditions in Mill Hollow and in turn provide an improved buffer for Saddle Creek. Two other riparian fences were also included in the decision; one in Saddle Creek directly to the south of the allotment and one in Bubble Springs, six miles west of North Rich Allotment.

Summary

Expected cumulative effects to aquatic habitats and aquatic and semi-aquatic species with implementation of Alternative A will result in maintaining current degraded conditions outside of exclosures, and improving conditions inside exclosures. There remains a high risk to the BCT population in Saddle Creek due to natural processes outside the influence of the Forest Service (drought, flood, or fire) and risks intrinsic to small isolated populations. There would be an expected improvement in aquatic habitat conditions with implementation of Alternative B. Projected time for improved stream habitat conditions under reduced grazing could be 10 to 20 years in areas outside exclosures and 5 to 10 years within exclosures. The exception would be the Hells Hollow exclosure, where habitat conditions are likely approaching their potential. Risks to BCT are similar to Alternative A. Implementation of Alternative C would result in the quickest recovery of stream habitat, although it would result in a reduction in pond habitat. Risks to BCT are the same as the other alternatives. Implementation of Alternative D will result in a small improvement from current conditions in areas outside of exclosures, and improving conditions inside exclosures. Risks to BCT are the same as the other alternatives.

4.3 Effects on Heritage Resources

4.3.1 Introduction

This section describes the effects on heritage resources that could result under the proposed action or any of the alternatives.

4.3.2 Issues Addressed

Chapter 1 outlined resource issues raised during public involvement. The following issue is addressed in this section.

- How would implementation of the proposed action or any of the alternatives affect heritage resources within the North Rich Allotment?

The area within the allotment has been used by small groups of people for as long as 10,000 years. These people include Native American hunters and plant gatherers, as well as Euro-American timber harvesters and livestock grazers. The concern is that livestock grazing and/or associated improvements could physically damage physical evidence of this heritage, such as artifacts or archaeological sites.

Measurement indicator used to compare alternatives:

a. The degree of protection provided for known and unknown archaeological sites.

4.3.3 Effects Analysis Methods and Assumptions

Cultural resource surveys for projects on the Wasatch-Cache National Forest are conducted in a phased approach. A records search of previous survey projects is completed for the research area. Depending on the scope of the alternatives, a preliminary inventory is conducted in the project area. This broad level of survey is to get an idea or understanding of the project area in order to address any serious cultural resource concerns at the broad scale. In the case of North Rich Allotment, those portions that were identified by the soil scientist, hydrologist, and forest ecologist as the most impacted areas within the North Rich allotment (generally the springs and riparian areas where the cattle congregate) were inventoried.

Depending on the scope of the project, a second phase of cultural resource inventory involving site-specific surveys may be implemented (after an alternative has been selected). At this point, specific locations of ground-disturbing activity, such as fence locations or vegetation treatment areas, are for the presence of cultural resources. If resources are located, generally, the site-specific projects can be altered or adjusted to avoid impacting the sites.

Throughout this entire process, legal requirements of consulting with interested tribal parties as well as the State Historic Preservation Officer (SHPO) are fulfilled by presenting them an opportunity to comment on the results of survey reports as well as the analysis itself.

Based on previous field research performed in the area, cultural resources are generally found near water sources. The greatest resource impacts tend to occur in the riparian zones of springs and creeks. Sites located near water generally receive the greatest impacts from grazing because this is where cattle tend to congregate.

As was discussed in Chapter 3, Section 3.3.2, six sites have been recorded within the North Rich Allotment, discovered during the most recent survey specifically completed for the North Rich Allotment (field notes available in project file). These sites include: four prehistoric lithic scatters (located near springs), one historic trash scatter, and one historic carved aspen grove.

4.3.4. Direct and Indirect Effects

4.3.4.1 Alternative A (No Action - Current Management)

Boundary fence construction can potentially affect cultural properties. Once exact fence locations have been determined, locations will be surveyed for heritage resources and any known sites will be avoided or protected.

Under Alternative A, impacts to known cultural properties would continue as cattle use riparian areas containing lithic scatters (as described above). Without implementing projects, such as riparian fences that would curb the cattle from adversely affecting riparian areas and springs, effects to the known archaeological sites will increase. Depending on the degree of continuous effects, full salvage excavation may be necessary before the archaeological data is lost. Full excavation of a site can be expensive.

One potential indirect effect of Alternative A involves continued grazing use of the area. The southeastern portion of the Logan District is not very well known archaeologically. Continued impacts to known sites reduces the archaeological information of the area further.

4.3.4.2 Alternative B (Proposed Action)

Alternative B concentrates on protecting and rehabilitating sensitive areas, such as riparian zones and springs, from further adverse effects on resources. In general, these proposed actions would be beneficial to the known cultural properties in the area (four lithic scatters) which have been recorded near springs and riparian areas (as described above and in Chapter 3, Section 3.3.2).

The creation of the three-pasture rotation system for the allotment would require additional fence building. Fence construction can potentially affect cultural properties. Once exact fence locations have been determined they would be surveyed for cultural properties and any known sites will be avoided or protected.

Besides creation of the three-pasture system, Alternative B includes several projects that involve fencing of riparian areas and vegetation treatments (rotobeating, seeding, mechanical or chemical treatments and prescribed fire). Of the three riparian fencing projects proposed, Government Spring riparian fencing project (NRR04) has been previously surveyed and no cultural resources

were discovered (records are available in the project file). The two projects in Hells Hollow (NRR05 and NRR06) will require surveys prior to project implementation. Any sites found during surveys would be avoided or protected.

Ten vegetation treatment projects have been proposed under Alternative B. Four of those ten projects are prescribed fire for aspen regeneration. Cheney-Richardson Fork and Horse Lake project areas have received heritage resource inventories. South Peter Sink and Upper Hodges project areas will require heritage resource inventories prior to project implementation. Three projects are proposed to treat sagebrush: Middle Sinks, South Sinks, and Peter Sinks. These projects may have a combination of treatments including chemical, mechanical (rotobeating), prescribed fire, and subsequent seeding. Although the specific method of treatment has not been decided, general effects can be determined. An eligible prehistoric site was discovered at South Sink (42 RI 105) and will require protection from any mechanical treatment that may disturb the site. Chemical treatment and prescribed fire will have no effect on the site. Middle Sink and Peter Sinks will require heritage resource inventories prior to project implementation and any known sites will be avoided or protected.

Two vegetation treatment projects are proposed to reduce tarweed infestations and promote native plants in the area. As described above, an eligible prehistoric site was discovered at South Sink (42 RI 105) and will require protection from any mechanical treatment that may disturb the site. Chemical treatment will have no effect on the site. Upper Jebo has received previous heritage resource surveys. Since no sites were discovered, the tall forb treatment proposed for this area will have no effect on heritage resources.

Chemical treatments for noxious weeds (Slideout and Log Cabin Hollow) have no effects to cultural resources.

4.3.4.3 Alternative C (No Grazing)

Even with the elimination of grazing on North Rich allotment, boundary fence construction will still be required for adjacent allotments (i.e., Little Bear Sheep Allotment). Boundary fence construction can potentially affect cultural properties. Once exact fence locations are determined they will be surveyed for heritage resources. Any sites found will be protected or avoided.

With the absence of grazing cattle, direct effects to the archaeological sites found within this allotment will diminish considerably. Without the soil churning and vegetation loss resulting from cattle grazing, the soils and vegetation on and surrounding the sites will re-establish and stabilize, promoting protection of the sites.

There are no indirect effects to heritage resources from Alternative C.

4.3.4.4 Alternative D (Two Pasture, Deferred Rotation)

The implementation of the two-pasture deferred rotation system for the allotment would require less fence construction than Alternative B, since there are only two pastures in this alternative. Fence construction can potentially affect cultural properties. But since there are fewer miles of

fence constructed in this alternative, the potential for impact would be slightly less than Alternative B. Once exact fence locations have been determined they would be surveyed for cultural properties, and if found, cultural properties would be protected or avoided.

Effects from riparian fencing and vegetation treatments would be the same as under Alternative B. Implementing Alternatives B and D will provide protection to known heritage sites through construction of riparian (spring) exclosures.

Chemical treatments for noxious weeds (Slideout and Log Cabin Hollow) would have no effects to cultural resources.

4.3.5 Mitigation

Heritage resource sites known within this allotment will be protected. Prior to activities and operations that affect range improvement activities such as water developments or fencing, the appropriate archaeological inventories and consultation under the supervision of the Forest Archaeologist will occur.

4.3.6 Unavoidable Adverse Impacts

If Alternative A is chosen and under current management no action is taken to protect the known heritage resources identified in the North Rich Allotment, then site impacts will continue to occur.

4.3.7 Short-term Uses vs. Long-term Productivity

There is no long-term productivity associated with heritage resources.

4.3.8 Irreversible and Irretrievable Commitments

If Alternative A is chosen and under current management no action is taken to protect the known heritage resources identified in the North Rich Allotment, then site impacts will continue to occur and the value of these known sites may be lost.

4.3.9 Cumulative Effects

Area of Influence

The area of influence for cumulative effects analysis for heritage resources is the North Rich Allotment and the immediate area where grazing is taking place.

Effects of past, present and reasonably foreseeable future connected and cumulative actions, including the proposed action

Existing conditions are the result of past and current management activities, such as forest roads, forest and rangeland management, as well as natural processes such as wildfire and flood. The

interdisciplinary team identified past, present, and future ground disturbing activities (see Appendix J). Given the nature of these activities, the cumulative impact to heritage resources can be summarized into the following categories:

1. Historical and current livestock grazing
2. Past, present, and future roads and trail management
3. Timber harvest
4. Fire (prescribed, suppression of natural and human-caused fire)
5. Riparian fencing

Grazing

The turn of the 19th century witnessed the highest numbers of grazing livestock and sheep in Rich County as well as the Logan Ranger District. According to historic records, the North Rich Allotment had at least twice the numbers of cattle during the 1920s than exist today. In addition, 3,000 to 5,000 sheep also grazed in the area. Historic high levels of grazing had an effect on the allotment including such things as soil erosion, poor vegetation cover, and riparian area impacts. Grazing can have cumulative impacts on heritage sites. Grazing cattle and sheep require construction of water developments that usually involve diverting a spring source to a trough or stockpond for cattle and sheep. Springs are likely areas where people lived in the past also. As a result of cattle congregating at the spring area as well as waterline construction for troughs, a prehistoric site may be impacted (for example, from movement of soil or compaction).

Road and Trail Management

Erosion can be expected at trails and roads that are not adequately maintained. Roads and trails do sometimes bisect a cultural site, but it is not common. If the trails and roads are near water features, the likelihood increases. Roads provide access to areas and activities accompany that access (i.e., riding off trail) that may prove to have negative effects to heritage sites.

Timber Harvest

Timber harvests have the potential to impact heritage sites (i.e. removal of soil from skidding trees to decking areas, compaction at decking areas, and felling trees on above ground heritage features) When planning timber harvests, any heritage sites that may be within or adjacent to the cutting unit boundary are avoided or protected from impact.

Fire

Prescribed fires are planned for portions of the North Rich Allotment (as described in Chapter 2). Fire itself can burn organic artifacts completely or change the chemical composition of some artifacts (i.e., lithic and ceramics) so that identification is impossible. Suppression activities, such as fire line construction with bulldozers, can also cause negative impacts or total destruction to heritage sites. Known heritage sites would be protected or avoided where possible in the event of wildland fire.

Riparian fencing

Three riparian fencing projects are to be completed in the summers of 2003 and 2004 within the North Rich allotment (Tin Cup Spring, Jebo Spring, and Mill Hollow Spring). All three projects have been surveyed for heritage resources and no sites were found.

Summary

Expected cumulative effects to heritage resources with implementation of Alternative A will result in continued impacts occurring at the six known sites on the allotment. Alternative A will maintain a high risk that heritage sites will continue to receive adverse impacts from cattle grazing. Implementing Alternatives B and D will provide protection to the four known heritage sites associated with riparian areas through construction of riparian exclosures. Alternative C would result in future (after three years) full protection of known and unknown heritage sites from impacts from cattle grazing and water developments.

4.4 Effects on Recreation, Roads and Trails

4.4.1 Introduction

This section describes the potential effects of grazing and range facilities development on recreation experiences on the North Rich Allotment. Effects are presented by alternative and are described as direct, indirect or cumulative. The identified issue presented below drives the analysis of effects.

4.4.2 Issues Addressed

The following issue identified in Chapter 1 is addressed in this section:

- How would the proposal or any of the alternatives affect summer and winter recreation experiences in the area within the North Rich Allotment (referred to as the Sinks Road vicinity)?

Measurement indicator used to compare alternatives:

a. The degree to which summer and winter recreation experiences in the Sinks area are affected by the presence of livestock and by fences constructed for range management under the proposed action or alternatives to it

4.4.3 Effects Analysis Methods and Assumptions

The effects analysis is based on literature reviewed, Revised Forest Plan direction, the 1997 dispersed recreation inventory, and the 1997 Logan and Ogden Ranger District Travel Plans. The following are management assumptions concerning recreation use in the area.

- Recreation *opportunities* (such as opportunities to hike, bike, hunt, camp) are not tied to grazing management and would not be affected by the proposal or alternatives to it. Opportunities as described by the Recreation Opportunity Spectrum in the Forest Plan would not be affected.

- Recreation *experiences* may be affected by the sight, sound or smell of cattle. They may also be affected by severely impacted vegetation, fences in travel ways, and range facilities development.

4.4.4 Direct and Indirect Effects

The presence of livestock and evidence of livestock grazing has the potential to diminish the recreation experience for some people using roads, trails, and dispersed camping sites in the Sinks Road vicinity. Fences and gates can potentially impeded travel or cause a safety concern for those riding a snowmobile cross-country in the winter. The following describes the potential effects of the proposed action and alternatives to it.

4.4.4.1 Alternative A (No Action - Current Management)

This alternative would have the greatest potential long-term impact to recreation experiences, because grazing is season-long throughout the entire allotment and there is no pasture that is rested for any part of the grazing season. Recreation experiences would be dependent on the expectations of visitors as much as range conditions. Some conflicts would continue and cattle congregating in or near their campsite may impact some campers' experience.

However, as a positive benefit to winter recreation, there would be no new pasture fences built that could potentially impede snowmobile travel. Under this alternative only boundary fences would be constructed.

With cattle still on the range and no identified need or funding to improve recreation travel ways with additional gates and cattle guards, conflicts where they exist will continue or possibly increase. Conflicts are likely to increase as Rich County continues to grow and urbanize and more people come to use the forest for recreation.

4.4.4.2 Alternative B (Proposed Action).

This alternative would have the potential for both negative and positive impacts to recreation experiences, while providing long-term improvement to the resource.

On the positive side, with the three-pasture, rest rotation grazing system, visitors to the area who choose not to be around cattle will be able to recreate in or near a rested pasture, providing the separation of uses they desire.

The greatest direct effect to the recreation experience will be from vegetation treatments, particularly the prescribed burns. This would have the greatest effect in the fall, when use in the area is highest and hunting is the main activity. Burned over campsites and favored hunting areas may impact hunting experiences in the short-term. However, the majority of the prescribed burn areas are not located in heavily camped areas. Road closures associated with the burns would affect recreation use during the treatments, particularly burn units 97-1-1 and 96-2-1(as shown on Figure 2.2).

Areas proposed for mechanical treatment will likely have a slight short-term impact on recreation experiences. There are very few campsites in the areas proposed for sagebrush or tarweed treatments, so displacement of campers would be minimal. Some visitors will not like seeing treatment areas, particularly during the actual treatment, some will not notice the treatments, and others will like the fact that action is being taken to restore the treated areas. Treatments done in the spring or summer will have less impact than treatments in the fall, during the hunts, when campsites fill up and campers would have a more difficult time avoiding treatment areas.

Pasture fences constructed for this alternative may negatively affect some travel routes, but gates and cattle guards can minimize the impact. This effect will be greatest along the Elk Canyon Divide trail and the Dugway Springs motorized trail. Fencing along major travel ways (Temple

Fork Road and the Sinks Road) may impact the aesthetic qualities of the area depending on the type and location of the fencing. Buck and pole fences tend to blend in with the natural surroundings more than wire fences. The type of fencing used will also be critical in the winter as the entire area is open to snowmobile travel. The effect would be minimal on groomed trails (they largely follow the road system and will likely have openings in the fences). Off-trail snowmobile travel could be affected where lay down fences are not maintained or buck and pole fences are used. During the winter months, over snow travel may be redirected to gate openings where the snow pack does not cover fence tops.

4.4.4.3 Alternative C (No Grazing)

Once grazing is phased out, this alternative would have the greatest positive effect on the recreation experience for those visitors who do not like seeing or being around cattle. Those who like seeing cattle would be displaced to other allotment areas. There would be no effect to travel routes since no new fences would be constructed, and there would be no more conflicts with livestock and recreation visitors.

Over time, as vegetation is restored, some visitors may find the area more visually attractive. Recreationists whose experience is affected by the sight or smell of cattle would benefit, while others who are not concerned with seeing cattle would have no change.

4.4.4.4 Alternative D (Two Pasture, Deferred Rotation)

This alternative, like Alternative B, would have the potential for both negative and positive impacts to recreation experiences, while providing long-term improvement to the resource.

On the positive side, with the two-pasture, deferred rotation grazing system, visitors to the area who choose not to be around cattle will be able to recreate in or near a rested pasture during some portion of the grazing season, providing the separation of uses they desire. This would be to a lesser degree than Alternative B, however, since this alternative is a deferred rotation, and no part of the allotment is rested for the entire grazing season.

With the construction of one pasture fence, there would be the potential for impeded winter travel by snowmobiles, but to a lesser degree than Alternative B which has two pasture fences.

Direct effects on the recreation experience as related to vegetation treatments would be the same as Alternative B.

4.4.5 Mitigation

There is no additional mitigation for recreation impacts beyond what is included in the proposed action and alternatives as discussed in Chapter 2.

4.4.6 Unavoidable Adverse Impacts

Unavoidable adverse impacts would continue to occur under Alternative A, for those recreation visitors who desire not to see cattle or their grazing effects. This is because there would continue to be no area within the allotment that would be rested for any part of the grazing season.

4.4.7 Short-term Uses vs. Long-term Productivity

There is no long-term productivity associated with recreation resources in this analysis.

4.4.8 Irreversible and Irretrievable Commitments

There are no irreversible or irretrievable commitments associated with recreation resources in this analysis.

4.4.9 Cumulative Effects

Area of Influence

For the cumulative effects analysis for recreation resources, the area of influence is the North Rich Allotment and major travel routes entering the allotment. The most important of these are the Logan Canyon Scenic Byway and the Hardware Ranch Scenic Backway.

Effects of past, present and reasonably foreseeable future connected and cumulative actions, including the proposed action

The interdisciplinary team identified past and future ground-disturbing activities (see Appendix J). Present actions and associated direct and indirect impacts were described earlier in this section. Of the past and future activities identified, the following are considered relevant to recreation resources:

Past Activities

- Travel Planning
- Unauthorized use of roads or trails
- Grazing since the turn of the century

Future Activities

- Travel Plan Update
- ATV Trail

Travel Planning
The current travel plan was developed in 1988, refined again in 1991, and slightly modified in 1997. Route densities were considered excessive and therefore numerous open routes were

closed to motorized use. In addition, routes were identified that the Forest Service felt were having too great of impact on the biophysical component of the landscape (routes too steep, too close to water). Many of these routes were physically closed by placing barrier rocks, berms, or signs where the routes leave authorized roads or trails. The decision made was that travel would only be authorized on routes designated as open on the travel plan map. This had the effect of reducing the watershed impacts due to motorized use. Some of the routes closed included routes used by the grazing permittees to access and maintain range developments.

Unauthorized Use of Roads and Trails

Not everyone agreed with the travel plan decisions. Over time motorized users were again riding many of the closed routes. Signs are torn out, barrier rocks removed, and berms have filled in. The huge increase in motorized recreation has continued to increase use of these unauthorized routes. The majority of this use occurs during the hunting season. With the increase in vehicle technology, machines are now capable of pioneering routes up ridges and re-opening or pioneering routes to springs and water developments. These route are often poorly located and may contribute to watershed damage.

Grazing Since the Turn of the Century

Visitors to the North Rich Allotment have seen cattle and or sheep present through history. Many of the campers who visit the area in the summer are used to seeing cattle and their impacts; therefore, they may be less likely to complain about their interaction.

Travel Plan Update

The Revised Forest Plan has determined that the Logan Ranger District will need to update the Travel Plan within the next five years. This process may either open or close additional routes within the North Rich Allotment. Increasing development at Bear Lake, geared towards summer home development, will increase the demand for more motorized linkages to the National Forest and is likely to increase recreation visitor use of the North Rich Allotment area. These new visitors are likely to be more urban oriented than existing residents. Changes in the Travel Plan may require additional gates or cattle guards if routes are reopened or new routes are developed.

ATV Trail System

This trail system would traverse the Logan Ranger District. As proposed, the system would not involve opening new routes, but would include signing of existing routes.

Summary

Expected cumulative effects to the recreation experience with implementation of Alternative A will result in no change from current situation. Those visitors who choose not to see livestock or evidence of grazing will continue to be adversely affected. Implementing Alternatives B and D would potentially improve the recreation experience for some, as these alternatives provide situations where recreation activities may occur without the presence of livestock (in rested pastures). Implementation of Alternative C, in combination with past and foreseeable future actions would provide the greatest opportunity for those whose desire to recreate without the influence of cattle grazing.

4.5 Socioeconomics Effects

4.5.1 Introduction

The following discussion addresses the direct, indirect, and cumulative effects of livestock grazing on the North Rich Allotment on socioeconomics.

4.5.2 Issues Addressed

Chapter 1 identified one issue connected with the socioeconomic situation of the North Rich Allotment. It is as follows:

- What positive or negative socioeconomic impacts would occur under implementation of the proposed action or any of the alternatives?

This issue involves the local livestock industry and, to a large degree, the local economy of Rich County which is dependent on a continual source of available forage on public lands. The lifestyle and traditions associated with cattle grazing are an important factor in the lives of the permittees and the rural communities in Rich County.

Measurement indicator used to compare alternatives:

a. The relative degree to which North Rich permittees and Rich County are affected by the proposed action or alternatives to it

4.5.3 Effects Analysis Methods and Assumptions

The majority of this analysis is based on information from the Utah Department of Agriculture and Food Annual Report (2001), the Revised Forest Plan (USDA Forest Service 2003), Wasatch-Cache National Forest financial records, 1998 IMPLAN data (available in project file), and personal interviews conducted with North Rich permittees.

Although one permittee lives in Box Elder County, the rest of the permittees live in Rich County and thus we used Rich County as the area of influence. We assume that the economic effects of one permittee on Box Elder County are negligible for this analysis.

4.5.4 Direct and Indirect Effects

Boundary fence construction is included in Alternatives A, B, and D. If one of these alternatives is selected, the permittees can expect an increased cost associated with the labor for building and maintaining the boundary fences.

Economic effects to permittees are related to cattle numbers, not changes in cattle weight gains as potentially affected by grazing systems. Substantial differences in weight gains are not expected to occur with the implementation of any of the grazing systems proposed. Holechek and others (1987) noted that cattle weight gains and diet quality did not differ significantly under rest-rotation, deferred-rotation, or season-long grazing systems when properly managed. Hart and others (1988) found that heavier stocking rates resulted in greater utilization, but that there was no difference in weight gain of steers among different grazing systems (including deferred rotation, short duration rotation, and season-long grazing) at moderate stocking rates. At high stocking rates, however, average daily weight gain declined. Economic effects to the permittees, therefore, would result from any reductions in numbers over time, not from changes in weight gains.

Grazing systems have been shown to improve distribution of livestock and, as a result, more forage in the allotment is consumed. The relative effects for the permittees, therefore, would be expected to correspond to the relative change in available forage, the associated stocking rate, and proposed improvements within the alternatives.

4.5.4.1 Alternative A (No Action – Current Management)

When compared to other alternatives, Alternative A would best benefit the local economy as well as each permittee. Under this alternative, there is no reduction in livestock associated with implementing a pasture system. The permittees would not be responsible for building pasture fences, although they are still responsible for the labor in building and repairing boundary fences (the Forest Service typically purchases the materials). The local economy would continue to benefit slightly since livestock grazing would continue at current levels.

4.5.4.2 Alternative B (Proposed Action)

One of the objectives of the range management program of the National Forests is to contribute to the economic diversity and social well-being of people by providing opportunities for economic diversity and promoting stability for communities that depend on range resources for their livelihood (FSM 2202.1(4)). This alternative meets this objective as well as other objectives outlined in Chapter 1. In addition, most ranchers' goals include improving livestock quality and production, as well as improving the quality of forage, soil stability, and wildlife habitat.

To implement the proposed alternative, several actions must be taken to improve the vegetation and soil condition on the allotment. Under this alternative, 2 miles of boundary and pasture fence would be constructed each year for about 6 to 7 years, to complete the needed boundary and pasture fences. The Forest Service is responsible for providing materials while the permittees are responsible for the actual building (labor) of the fences. On average, one mile of fence, including labor and materials, currently costs about $9000 per mile.

Under Alternative B, permittees must provide 2 to 4 herders to manage the cattle on the two open pastures of the allotment. The costs associated with hiring herders for the grazing season lie solely with the permittees.

Alternative B requires resting one pasture (during the season) while two others remain open for grazing. Permittees would be required to reduce their stock by about 1/3 to account for the closed (rested) pasture, and thus they can expect a reduction in livestock head and/or income by about 33%. The loss of potentially 33% of North Rich's livestock would be a minor impact on the payments to the County since those payments are averages of several activities including timber, recreation, grazing, and other receipts. Over the long term, better management of the allotment through a rest-rotation grazing system could result in more available forage.

4.5.4.3 Alternative C (No Grazing)

Alternative C would have the greatest negative impact on the permittees. Each permittee has indicated that their Forest Service permit is an integral part of and important to the success of their business. Without permits enabling them to graze their livestock on the national forest, they could go out of business since Federal rangelands are seasonally important in the production process. The 1260 cow/calf pairs allowed on the North Rich allotment account for 2% of the total value of the cattle industry in Rich County. Overall impacts would be the loss of tax base, and local purchases of goods and services. Indirect impacts may include permittees' land adjacent to the Forest being sold and subdivided into small parcels (ranchettes). One permittee admitted to having his land already appraised for subdivision. When land is developed, Government receives an increase in taxes, but it usually spends more on services to support that development than it ever did on farmland (Spielmaker 2000). Additionally, the permittees' properties represent important winter range habitat for many wildlife species that would no longer be available to them if these lands were developed.

4.5.4.4 Alternative D (Two Pasture, Deferred Rotation)

When compared to other alternatives, the socioeconomic effects of Alternative D would be intermediate between Alternatives A and B. Alternative D would better benefit each permittee than under Alternative B in that there would be no reduction in numbers and only one pasture fence would be constructed. The permittees would be responsible for building the pasture fence, and for the labor in building and repairing boundary fences (the Forest Service typically purchases the materials). As under Alternative A, the local economy would continue to benefit slightly since current numbers of livestock would continue.

4.5.5 Mitigation

All mitigation measures required for the North Rich Allotment are located in Chapter 2, Section 2.5 (Management Requirements Common to All Alternatives).

4.5.6 Unavoidable Adverse Effects

If Alternative C were chosen as a result of this analysis, then an unavoidable adverse effect would be the termination of permits for ranchers that are currently permittees. Current permittees would be required to find rangeland elsewhere, which according to them, would be difficult and more expensive than the current costs associated with their North Rich grazing permits.

4.5.7 Short-term Uses vs. Long-term Productivity

This section is not applicable to the socioeconomic analysis of the North Rich Allotment.

4.5.8 Irreversible and Irretrievable Commitments

There are no associated irreversible and irretrievable commitments associated with the North Rich Allotment regarding socioeconomics.

4.5.9 Cumulative Effects

Area of Influence

The area of influence for cumulative effects with respect to socioeconomic issues is Rich County, Utah, because this is the county in closest proximity to the allotment and within which all but one of the permittees lives.

Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action

With expanding urban influences, Rich County residents are likely to experience higher levels of government influence in their lives, possibly exacerbating feelings about governmental restrictions and their impacts. The growing list of management actions and restrictions on activities and uses required by the Endangered Species Act, the Clean Water Act, and other Federal legislation may also serve to frustrate local governments and citizens who believe that too much local control has been lost. This could affect local communities that have traditionally depended on these uses for enjoyment and as part of their rural culture and values.

It will become increasingly difficult to provide the same wide range of opportunities that have been available in the past as the number of users increase and uses on the already limited space available are further constrained. Those with economic ties to Forest resources will likely find it increasingly difficult to locate alternative sources on neighboring public lands. Growing numbers of Forest users, conflicting objectives, and the need to ensure ecosystem health and sustainability will require compromise on the part of all involved to resolve differences. Increased strain between user groups may occur, but active efforts by local communities and state and federal agencies will seek means toward cooperation and reconciliation.

4.6 Effects on Vegetation

4.6.1 Introduction

Fire, fire suppression, livestock grazing, insects and disease, and timber harvest have each played important roles in the existing conditions on the North Rich Allotment and surrounding areas. **Fire suppression** is at least one factor contributing to the movement of aspen-dominated communities to those dominated to varying degrees by both aspen and conifers. Our Conifer/Aspen and Aspen/Conifer cover types, which combined occupy approximately 9 percent of the allotment generally indicate this transition. Fire suppression has also caused the reduction in age class diversity of the tree-dominated plant communities in the allotment. While some **natural fires** have played a role in establishing younger stands within the allotment (e.g. the Edgar fire), most conifer and aspen communities in the allotment are older.

Because most of the conifer-dominated communities are old, they are more susceptible to **insects and disease**. Many existing high-elevation spruce-fir-dominated communities are susceptible to insects and disease, because of age and density and are being analyzed for thinning treatments. **Timber harvest** has played a role in the conditions of plant communities in the Allotment. About 5 percent of the allotment has experienced some level of timber harvest, thus increasing age class diversity within these conifer-dominated communities. An attempt has been made to more mimic the natural characteristics of fire effects on conifer communities with the most current harvest in Slideout Canyon (200 acre opening in lodgepole pine-dominated communities).

Livestock grazing has caused the greatest changes in plant species composition in the herbaceous component of aspen plant communities in the allotment. Historic livestock use was responsible for species composition and existing aspen community types (Mueggler 1988) in inventoried aspen communities within the allotment. Livestock also played a role in the reduction of the shrub component in many aspen stands within the allotment. Because of these changes, there has been a reduction in fine fuels that typically carry fire through these communities. In addition, there has been a loss in the biological diversity of these communities.

Sagebrush communities also show the effects of historic livestock use. Typically, a reduction in ground cover below desired conditions indicates a loss of the herbaceous component. An inventory of these communities found that, in some instances, the herbaceous component is nearly absent. Most communities identified as Historic Tall Forb communities have been altered to the point that they no longer have the herbaceous component that once dominated these sites. In some areas, topsoil may have been lost and the ability to support these communities no longer exists without intervention. The following discussion addresses the direct, indirect, and cumulative effects of each alternative on vegetation.

4.6.2 Issues Addressed

The following issues identified in Chapter I are addressed in this discussion:

How would implementation of the proposed action or any of the alternatives affect upland and riparian vegetation condition and trend?

Some areas of the North Rich Allotment are not at or moving toward desired conditions. A number of factors, including past grazing practices, wildlife use, recreation use, and the exclusion of fire can be associated with the current rangeland vegetation condition. In some areas, ground cover percent, species composition, and ecological status are not as desired. Grazing can cause unacceptable impacts to the vegetation condition (composition and structure) if not managed properly.

Riparian areas provide unique habitats for plants and wildlife. Uncontrolled and sustained heavy use of riparian vegetation can result in decreased plant vigor, decreased structural and species diversity, loss of soil productivity, and a potential loss of habitat for wetland-dependant species.

How would implementation of the proposed action or any of the alternatives affect Threatened (T), Endangered (E), or Forest Service Sensitive (S) plant species?

Although no threatened or endangered plant species protected under the Endangered Species Act occur within the North Rich Allotment, suitable habitat does occur within the allotment for some plant species listed as sensitive in the Forest Service Intermountain Region. Three sensitive species that could potentially be affected by the proposal and/or the alternatives include the Starvling milkvetch (*Astragalus jejunis* var. *jejunis*), Logan buckwheat (*Eriogonum brevicaule* var. *loganum*), and Brownie lady slipper (*Cypripedium fasciculatum*). In addition, Wasatch rockcress (*Arabis lasiocarpa*), a species identified as rare by the Utah Natural Heritage Program and as a Wasatch-Cache National Forest Watch List plant species, occurs just north of the allotment boundary and has potential habitat within the allotment.

Measurement indicators used to compare alternatives:

a. The rate of change and degree to which ground cover and species composition are improved through the proposed action or alternatives to it

b. The degree to which sensitive or rare plants are affected by the proposed action or alternatives to it

4.6.3 Effects Analysis Methods and Assumptions

The effects analysis was based on literature that has described effects associated with various grazing systems as well various levels of use. Anderson and Holte (1981) found that sagebrush communities in southeastern Idaho, with 25 years of complete rest (1950

to 1975), had an increase in shrub cover (mostly big sagebrush with some green rabbitbrush) from approximately 17 percent to over 26 percent. The species of sagebrush that likely occurs in this area and elevation is mountain big sagebrush. These authors also found that grasses increased from slightly more than 0.25 percent to nearly 6 percent during this same period. Watts and others (1987) found that a rest-rotation grazing system could maintain vegetation cover and trend, and ground cover, in a manner similar to that found under complete rest. It is, therefore, theorized that complete rest or implementation of a rest-rotation grazing system on the North Rich Allotment would result in similar increases. West and others (1984) found that complete rest of sagebrush in the Tintic Valley of Juab County, did not respond in the same manner as the site studied in southeastern Idaho. However, the location in the Tintic Valley study was likely dominated by Wyoming big sagebrush, which is more common at these lower elevations (near 5,000 ft.). Dillon (1958) found that that vegetation responded slightly to moderately better under deferred grazing than under continuous or season-long grazing in Palouse bunchgrass ranges, but Hyder and Sawyer (1951) found no benefits on flat sagebrush grasslands over rest-rotation grazing systems. Holechek (2001) noted that deferred-rotation grazing allowed those plants and areas preferred by livestock to maintain and gain vigor better than season-long use.

Hart and others (1993) found that, regardless of the grazing system used, stocking rates had a greater potential to affect changes in vegetation composition of rangeland plant communities, than did grazing systems. In contrast to their findings, however, Hormay and Talbot (1961) noted that a rest-rotation grazing system showed great promise for improving rangeland conditions on perennial bunchgrass range. They reported that the main purpose of this grazing system was "to allow the grazed plants to recover vigor, produce seed, and establish new reproduction." Hormay (1970) described in more detail the values of a rest-rotation grazing system. He noted that close defoliation of plants year after year causes them to lose food reserves and ultimately to die. Under season-long use, the more palatable rangeland forage species experience this defoliation year after year, which causes the species composition to change to less palatable species or change to species that are more tolerant of this level of use. These more tolerant species in the North Rich allotment are typically non-native riparian species, such as Kentucky bluegrass (*Poa pratensis*) or red top (*Agrostis stolonifera*).

It was assumed that a lower utilization rate on unsatisfactory condition rangelands would help move vegetation towards desired conditions. Eckert and Spencer (1986) found that, even under a proper grazing system, heavy utilization (65 to 75 %) prevented range improvement. Eckert and Spencer (1987) noted that proper use must be included in management plans for rangelands to allow desirable species to respond to proper management. As noted above, Hart and others (1993) found that stocking rates had a greater potential to affect changes in vegetation composition of rangeland plant communities, than did grazing systems.

Holechek et al. (2001) noted that sagebrush grasslands and mountain shrublands in poor (unsatisfactory) condition should receive 30 percent utilization when grazed during active forage growth. The Revised Forest Plan (USDA Forest Service 2003) includes a forage

utilization guideline of 30-40% on areas in unsatisfactory condition, because active forage growth occurs only during the first part of the grazing season. With implementation of this guideline, areas of both upland and riparian vegetation in unsatisfactory condition would improve with riparian areas restored more quickly than uplands because of the greater available water and subsequently longer growing season.

The Forest ecologist assumed that by leaving more herbaceous materials, especially grasses, which have high silica content (Shewmaker and others 1989), ground cover would increase faster in rested pastures than in pastures grazed each year. Because more ungrazed materials would remain at the end of each grazing season, it would be available to be incorporated into surface organic material (litter) and provide soil protection. For example, if an ungrazed bluebunch wheatgrass plant were approximately 18 inches tall (including inflorescence), a plant grazed at 30 percent would be approximately 8.5 inches tall; one grazed at 50 percent would be about 5.5 inches tall. An ungrazed western wheatgrass plant that is 15 inches tall would be about 8 inches tall at 30 percent use, and about 5.5 inches tall at 50 percent use. This assumption, however, has not been supported in known literature.

Bartos and others (1994) found that with three different burn severities (low, moderate, and high), herbaceous production increased from 23 to 46% over preburn conditions. The authors also found that forb production increased from 66% of the understory production prior to the burn, to a high of 82% to 92% six years after treatment, then six years later dropped to 73% to 79% of the undergrowth. Fitzgerald and others (1986) found that aspen was grazed more often late in the season than early. Fitzgerald and Bailey (1984) found that a single heavy grazing nearly eliminated aspen regeneration.

Mueggler (1985) noted that some aspen communities are no longer capable of returning to their original diversity of species (species composition) either because historic grazing actually changed the site's environment, or because of the competitive nature of existing invader species. Species, such as western coneflower (*Rudbeckia occidentalis*), which have low palatability for all grazing animals, tend to dominate communities where it was present before heavy grazing occurred.

For noxious weed treatment, herbicides may be more aggressive in eradication, while biological agents (biocontrols) would be more successful in controlling widespread populations (Evans 1993). Biological agents may also be used in areas where herbicide use, such as around live water, may be limited or not allowed.

4.6.4 Direct and Indirect Effects

The direct effects of livestock grazing include physical damage to riparian streambanks and general riparian areas, and displacement and compaction of soils. They also include remnant herbaceous matter that remains following grazing to be incorporated into the surface organic matter (litter). The indirect effects of livestock grazing include the loss of vigor, reproduction, and ultimately the competitive status of less desirable forage species. The change in species composition results in the indirect loss of forage

production.

The change in species composition also represents a change in wildlife habitat, both from forage loss and from a change in community/habitat structure. Livestock grazing in the North Rich allotment has also resulted in the reduction of ground cover in many sagebrush and historic tall forb communities. This ground cover provides important watershed protection as well as important organic matter for maintaining soil productivity. In addition, livestock grazing has likely reduced the fine fuels necessary to carry natural fires in sagebrush communities. Hayes and others (2000) noted that in Mesa Verde National Park in southwestern Colorado, livestock grazing likely removed the fine fuels that carried natural, more frequent fire in the communities that occur there. Because of historic grazing and the subsequent removal of competition from other plants, junipers increased significantly in the area. Then, following livestock removal in the 1930's, these fine fuels once again increased which may have resulted in the even larger fires that occurred later in the 20th century.

4.6.4.1 Alternative A (No Action – Current Management)

4.6.4.1.1 General Vegetation Effects

Under this alternative, vegetation conditions are expected to improve more slowly than under Alternatives B, C, and D except in existing fenced riparian areas where livestock use is already curtailed. Conditions of all vegetation cover types under this alternative are not expected to improve at a substantial rate. Because a lower utilization rate (30 to 40 %) will be applied to unsatisfactory condition rangelands in implementing the Revised Forest Plan, some improvement is still expected. Based on discussions by Hormay and Talbot (1961), however, even proper use without rest will not allow plants to fully recover, produce seed, and reproduce. Watts and others (1987) found that season-long grazing might not maintain satisfactory rangeland vegetation and ground cover conditions. Livestock grazing will impact vegetation the most in areas surrounding water developments. These areas, while relatively small, typically have a great amount of bare ground and low vegetation cover. Fire will continue to play a minor role in sagebrush communities with low herbaceous cover, which provide the fuels to carry fire.

Following are expected outcomes to vegetation in unsatisfactory condition in this alternative:

Untreated **sagebrush** communities currently in unsatisfactory condition because of the lack of ground cover, while expected to improve because of lower use, will do so at a slower rate than all other alternatives.

Many of the **aspen** communities in unsatisfactory condition are fully occupied by less desirable plant species, so composition will change slowly. Seeds of more desirable forbs (from a species diversity perspective) are generally absent and competition from existing species will tend to make conversion to more desirable species composition a

slow process (Mueggler 1985). Continued use, even at a lower level on unsatisfactory condition area, will likely not allow additional species to establish.

Riparian areas that are fenced under this alternative will improve at the same rate as under the no grazing alternative. Other riparian areas will improve at the slowest rate, because each of the other alternates allows rested pastures one out of three years (Alternative B), deferred rest (Alternative D), or complete rest (Alternative C).

Historic tall forb communities will not change to any great degree under this or any other alternative unless treatments are applied. Reasons for a slow change in these historic tall forb communities include the probable loss of topsoil, which changes site capability. In addition, tall forb species that once occupied these sites are no longer present to provide necessary seed for re-establishment. Continued use in these areas will likely keep them in the same condition.

Natural fire will continue to play a minor role in sagebrush communities with low herbaceous cover, but may increase in frequency and intensity if these fuels build up.

4.6.4.1.2 Management Indicator Communities

The age class and associated canopy cover classes for Sagebrush Management Indicator Communities would not change under this alternative. Without management intervention, the only changes would result from either natural fires or from unplanned human-caused fires.

4.6.4.1.3 Threatened, Endangered, and Sensitive Species

No Threatened, Endangered, or Forest Service Sensitive species are known to occur within the North Rich Allotment. Starvling milkvetch and Logan buckwheat, if present, have low resource value ratings[1] and have not likely been significantly affected by livestock grazing. Livestock grazing is not likely to affect Brownie ladyslipper, if present, because it occurs under conifer overstories with little forage, which are not generally attractive to cattle.

Wasatch rockcress, a Wasatch-Cache National Forest watch list plant, is known to occur in Sunrise Campground and about ½ mile south of the Bear Lake Summit near the northern boundary of the allotment. If this species occurs within the allotment, existing habitats should be maintained or somewhat improved under this alternative because of the lower forage utilization being applied to all unsatisfactory condition rangelands.

4.6.4.1.4 Noxious Weeds

As with each alternative, approximately 50 acres would be treated annualy, mostly located in past timber harvest units in Log Cabin Hollow and Slideout Canyon. Without

[1] Low **resource value rating** indicates that it is "not relished and normally consumed to only a small degree or not at all" (USDA Forest Service 1993).

giving priority to eradication of knapweed in the allotment, it is likely to expand its distribution onto adjacent lands.

4.6.4.2 Alternative B (Proposed Action)

4.6.4.2.1 General Vegetation Effects

Vegetation conditions are expected to improve more quickly and to a greater extent than Alternatives A and D because rest will be provided each year for one pasture within the allotment. The rate of improvement on untreated portions of the allotment will not be as great as that found under the no grazing alternative (Alternative C), but will not be substantially less than that alternative either; improvement on acres of treated areas will be greater than Alternative C. Watts and others (1987) found that a rest-rotation grazing system could maintain vegetation cover and trend and ground cover similar to that found under complete rest. Eckert and Spencer (1987) found that even under a rest-rotation grazing system, basal-area growth on common bunchgrasses was restricted with periodic heavy grazing pressure (greater than 65 percent use). Because of a combination of rest and the applied lower utilization rate on unsatisfactory condition communities, this alternative will allow the grazed plants to recover vigor, produce seed, and reproduce during rested years.

Vegetation will improve the most where treatments occur, where available moisture is adequate (e.g., riparian areas), and where desired plant species are present to re-establish themselves. Approximately 16 acres of riparian areas will be fenced, and about 600 acres of sagebrush would be treated with either fire, herbicide, or mechanically, then seeded. Approximately 42 acres of historic tall forb communities would be treated and 750 acres of aspen would be burned. The use of the herbicide Spike on sagebrush communities would result in a thinning of the shrub component, which would result in lower competition throughout the treated area and allow for seeded native grasses to be more uniformly successful. Burning would likely result in a more patchy appearance of sagebrush cover, which would be totally removed in areas with higher intensity of burns to totally intact in unburned areas. Seeding success would likely be greater in areas where competition from sagebrush was completely removed and lower in unburned areas. Mechanical treatment (rotobeating) would not likely kill all sagebrush plants, but would reduce cover and competition in a more uniform manner, similar to that from chemical treatment. Therefore, a similar success of seeding native species would occur.

Following are expected outcomes to vegetation in unsatisfactory condition in this alternative:

Treated sagebrush communities will have a large temporary reduction in sagebrush canopy cover and an associated increase in herbaceous cover as a result of seeding, reduced competition from sagebrush, and periodic rest. The area to be treated was chemically treated in the mid 1970's to reduce canopy cover of sagebrush. In the period since that treatment, canopy cover of sagebrush is about the same as before treatment in

the 70's. This unusually dense canopy of sagebrush has likely been the result of livestock grazing, which reduced competition from the herbaceous understory. Ground cover is expected to increase on these sites because of rest periods incorporated in the management system. **Untreated sagebrush** communities currently in unsatisfactory condition because of low ground cover, while expected to improve, will do so at a slow rate until herbaceous plants are allowed rest to germinate and become established. Untreated sagebrush sites currently in unsatisfactory condition will see an increase in ground cover as a result of periodic rest and lower use.

It is expected that **aspen** stands that are burned under this alternative will have an increase in forb production (Bartos and others 1994). DeByle (1985) noted that light grazing in aspen communities with new suckers by cattle (such as that which occurs following fire) was acceptable because their diet consisted primarily of herbaceous materials. The Edgar fire that occurred in 1994, partially on the North Rich Allotment, had successful regeneration of aspen without rest from grazing.

There will be a slow movement of untreated aspen toward desired conditions as described in Alternative A. Treated aspen will, however, likely improve quicker than under Alternative D, because annual rest to one pasture each year will increase vigor and the likelihood of establishment of other species in the understory.

Riparian areas that are fenced under this alternative will improve at the same rate as under the no grazing alternative. Other riparian areas will improve slower than Alternative C, which will receive complete rest of all riparian areas, but quicker than Alternatives A and D (Bohn and Buckhouse 1985).

Like Alternative D, approximately 42 acres of **historic tall forb** communities will be treated under this alternative. It is unclear, at this time, the results of these experimental treatments, but these communities will not change under this or any other alternative, except where treatments are applied. Reasons for a slow change in these historic tall forb communities are described in Alternative A.

When treatments are conducted in sagebrush, aspen, and/or historical tall forb communities, the overall rate of improvement will occur faster than under the no action and no grazing alternative, which include no treatments. Livestock grazing will continue to impact vegetation the most in areas surrounding water developments. These areas, while relatively small, typically have a great amount of bare ground and low vegetation cover. Natural fire will continue to play a minor role in sagebrush communities with low herbaceous cover, but may increase in frequency and intensity as these fuels build up in rested pastures. Natural fires would eventually return to a more natural fire return interval, should they be allowed to burn.

4.6.4.2.2 Management Indicator Communities

As noted above, approximately 600 acres of sagebrush would be treated. Associated canopy cover classes for Sagebrush Management Indicator Communities would change

under this alternative. This would help move the sagebrush cover type toward the desired Properly Functioning Conditions for this cover type.

4.6.4.2.3 Threatened, Endangered, and Sensitive Species

Effects are expected to be the same as under Alternative A.

4.6.4.2.4 Noxious Weeds

Effects will be as described under Alternative A with the exception that an emphasis is on eradication of knapweed on the allotment. Like Alternative D, chemicals would be used to initially try to eradicate this plant from the area. If this were unsuccessful, then biocontrol methods would be used to control knapweed while efforts to eradicate continue. Alternatives B and D would have the greatest impact on weed control and eradication of knapweed.

4.6.4.3 Alternative C (No Grazing)

4.6.4.3.1 General Vegetation Effects

Existing vegetation conditions are expected, in general, to improve more quickly under the no grazing alternative than under Alternative A or in the untreated portions of the allotment in Alternative B. Because this alternative does not include the amount of acres of vegetation treatment as Alternative B, the rate of improvement will be less on those treated acres. Vegetation will improve the most where available moisture and desired plant species are present to re-establish; the greatest improvement, then, will be in riparian areas. Because most riparian areas will be fenced under the proposed action, this alternative will not greatly differ from that alternative.

Aspen communities will improve as well because available moisture in these communities is greater than in sagebrush communities. Species composition is expected to change more slowly under this alternative because no acres of aspen are proposed for treatment. As noted above, because many of the aspen communities in unsatisfactory condition are fully occupied by less desirable perennial grasses and forbs, sites for the establishment of more desirable forbs are lacking. Sagebrush communities currently in unsatisfactory condition, while expected to improve, will do so at a very slow rate because of existing dry conditions, low cover of desirable species present, and lack of treatments.

As described in Alternative B, historic tall forb communities will not change to very rapidly under this or any other alternative unless treatments are applied.

Livestock grazing will no longer impact vegetation in areas surrounding water developments. These areas, will improve slowly because of historic levels of use and impacts to the soils, but this alternative is the only one that will result in the complete

healing of these sites over time. Fire will increase in frequency and in sagebrush communities as fine fuels increase in the ungrazed allotment. These fires will eventually return to a more natural fire return interval, should subsequent fires be allowed to burn.

Following are expected outcomes to vegetation in unsatisfactory condition in this alternative:

- **Sagebrush** communities are not treated under this alternative; therefore, species diversity in communities currently in unsatisfactory condition is expected to improve, at a slower rate than Alternatives B and D. Sagebrush communities currently in unsatisfactory condition will see the greatest increase in ground cover over all other alternatives because grazing is removed and all herbaceous materials will be available to contribute to ground cover.

- No **aspen** stands are burned under this alternative. Many of the aspen communities in unsatisfactory condition are fully occupied by less desirable plant species. While these communities will see increased vigor of understory species, they will not significantly see great changes in species composition. The reasons for slow movement toward desired conditions are described in Alternative B. As noted under Alternative A, light grazing in aspen communities following fire will not affect aspen regeneration. Regeneration of aspen has been successful in this area, with trees reaching heights well over 6 feet and densities sufficient to ensure that these stands will be maintained into the future.

- All **Riparian** areas will improve under this alternative at a rapid rate because of a decrease in physical impacts by livestock, as well as decreased effects of grazing. This recovery is more rapid than on adjacent uplands because of the greater availability of water, which results in longer growing seasons.

- Even with no grazing, **historic tall forb** communities will not change to any great degree under this or any other alternative unless treatments are applied. No acres are treated under this alternative so, like Alternative A, this will have the slowest recovery of this type. Reasons for a slow change in these historic tall forb communities are described in Alternative A.

4.6.4.3.2 Management Indicator Communities

As with Alternative A, no sagebrush would be treated. Associated canopy cover classes for Sagebrush Management Indicator Communities would not change under this alternative and would, therefore, not help move the sagebrush communities toward desired Properly Functioning Conditions for this cover type.

4.6.4.3.3 Threatened, Endangered, and Sensitive Species

Should any Threatened, Endangered, or Forest Service Sensitive Plant species occur within the allotment, there would be no effects from livestock grazing. However,

because livestock use is not expected to have a negative impact to those species with habitat in the allotment, the differences in the alternatives would be insignificant. Habitat for Wasatch rockcress, a Forest watch list plant, would improve and the species, if present, would have potential for increasing under this alternative.

4.6.4.3.4 Noxious Weeds

Weeds would be treated both chemically and with biocontrol agents. With the emphasis on biocontrol treatments rather than on the use of chemicals, eradication of knapweed is unlikely and size of populations of this species would be maintained, because of low seed production as a result of the use of knapweed seedhead gall flies.

4.6.4.4 Alternative D (Two-Pasture Deferred Rotation Grazing)

4.6.4.4.1 General Vegetation Effects

Vegetation conditions are expected to improve under this alternative because each of the two pastures will be grazed early one year, then later the next. This alternative, however, would improve conditions greater than Alternative A because deferred grazing allows upland plants to build up reserves and often times allow for some plants to go to seed. It will improve conditions to a lesser degree than Alternatives B and C, which provide rest for vegetation; one pasture would be rested each year under Alternative B or the entire allotment would receive complete rest under Alternative C.

As noted in **Section 4.6.3 Effects Analysis Methods and Assumptions** Dillon (1958) found that that vegetation responded slightly to moderately better under deferred grazing than under continuous or season-long grazing in Palouse bunchgrass ranges, but Hyder and Sawyer (1951) found no benefits on flat sagebrush grasslands over rest-rotation grazing systems. Holechek (2001) noted that deferred-rotation grazing allowed those plants and areas preferred by livestock to maintain and gain vigor better than season-long use. The expected rate of improvement is not as great as that found under the no grazing alternative (Alternative C) or the rest-rotation alternative (Alternative B), but should be moderately better than under the existing grazing (Alternative A). Because a lower utilization rate (35%) will be applied, plants will have more leaf area, which increases their ability to recover following use.

Vegetation will improve the most where treatments occur. As with Alternative B, approximately 16 acres of riparian areas will be fenced, and about 600 acres of sagebrush would be treated with either fire, herbicide, or mechanically, then seeded. Approximately 42 acres of historic tall forb communities would be seeded and 750 acres of aspen would be burned. Results of various treatments for sagebrush (Spike, mechanical rotobeating, or prescribed fire) would be the same as described under Alternative B.

Riparian areas that are fenced under this alternative will improve at the same rate as under the no grazing alternative. Unfenced riparian areas will improve at a slower rate.

As in Alternative B, treated sagebrush areas will have a large temporary reduction in sagebrush canopy cover and an associated increase in herbaceous cover as a result of seeding and reduced competition from sagebrush. Ground cover is expected to increase on these sites, but likely at a slower rate than under Alternatives B and C, because herbaceous materials will be removed each year, rather than remaining. Non-treated sagebrush sites currently in unsatisfactory condition will also see an increase in ground cover as a result of lower use.

Following are expected outcomes to vegetation in unsatisfactory condition in this alternative:

- Treated **sagebrush** communities will have a large temporary reduction in sagebrush canopy cover and an associated increase in herbaceous cover as a result of seeding and reduced competition from sagebrush. Ground cover is expected to increase on these sites because of lower utilization rates on rangelands in unsatisfactory condition, but not as much as Alternatives B and C. Untreated sagebrush communities currently in unsatisfactory condition will do so at a slower rate than under Alternatives B and C, because each year the entire allotment will be grazed because livestock will consume seed heads. Therefore, reestablishment of desirable species will occur at a lower rate. Untreated sagebrush sites currently in unsatisfactory condition will also see an increase in ground cover as a result of lower use.

- Without treatment, species composition in aspen communities is expected to change slowly under this alternative as well as under Alternatives B and C. It is expected that **aspen** stands that are burned under this alternative will have a similar response as under Alternative B, although the pasture that includes the treated aspen would not be rested. Grazing would be monitored to maintain appropriate regeneration of aspen. DeByle (1985) noted that light grazing in aspen communities with new suckers by cattle (such as that which occurs following fire) was acceptable because their diet consisted primarily of herbaceous materials. The Edgar fire that occurred partially on the North Rich Allotment had successful regeneration of aspen without rest from. There will be a slow movement toward desired conditions as described in Alternative A. As with Alternative B, an increase in forb production is expected (Bartos and others 1994).

- **Riparian** areas that are fenced under this alternative will improve at the same rate as under the no grazing alternative. Other riparian areas will improve at a slower rate.

- Like Alternative B, approximately 42 Acres of **Historic tall forb** communities would be treated. As noted above, it is unclear, at this time, the results of these experimental treatments, but these communities will not change under this or any other alternative, except where treatments are applied. Reasons for a slow change in historic tall forb communities are described in Alternative A.

Livestock grazing will continue to impact vegetation the most in areas surrounding water developments. These areas, while relatively small, typically have a great amount of bare ground and low vegetation cover. Fire will continue to play a minor role in sagebrush communities with low herbaceous cover. As the herbaceous component increases, fire will eventually return to a more natural regime and return interval should subsequent fires continue to be allowed to burn.

4.6.4.4.2 Management Indicator Communities

As with Alternative B, approximately 600 acres of sagebrush would be treated. Associated canopy cover classes for Sagebrush Management Indicator Communities would change under this alternative, which would help move toward the desired Properly Functioning Conditions for this cover type.

4.6.4.4.3 Threatened, Endangered, and Sensitive Species

Effects are expected to be the same as under Alternatives A and B.

4.6.4.4.4 Noxious Weeds

Effects would be the same as described in Alternative B. As with Alternative B, an emphasis would be placed on eradication of knapweed on the allotment. Alternatives B and D would have the greatest impact on weed control and eradication of knapweed.

4.6.5 Mitigation

Implementing the direction in the Revised Forest Plan will require no additional mitigation.

4.6.6 Unavoidable Adverse Effect

With implementation of management requirements listed in Section 2.5, no unavoidable adverse effects are expected.

4.6.7 Short-term Uses vs. Long-term Productivity

Long-term productivity has been affected by historical livestock use. As described by Mueggler (1988), herbaceous production of some of the aspen community types found on the North Rich Allotment is less than those that occurred historically on the allotment.

4.6.8 Irreversible and Irretrievable Commitments

No irreversible or irretrievable commitment of resources is expected.

4.6.9 Cumulative Effects

Area of Influence

The approach for this cumulative effects analysis was to review past, present, and reasonably foreseeable activities that may, or may have, positively or negatively affect vegetation conditions. The area of influence is the northern portion of the Bear River Range (generally north of State Highway 101 and Rock Creek) within the Wasatch-Cache National Forest.

Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action

Livestock Grazing
Livestock grazing on more than 185,000 acres on the Wasatch-Cache National Forest portion of the northern Bear River Range has changed rangeland conditions since its inception. While those conditions have not been recently assessed on most grazing allotments in this area, an analysis of the condition of the vegetation was conducted in the 1960's. At that time, range conditions were based on the similarity of existing vegetation composition to the potential for each vegetation type. Based on data on file for more than 130,000 acres of this area, approximately one third of the capable rangeland acres within allotments in the 1960's were determined to be in good or excellent condition; more than 45 percent were in fair condition; and less than 20 percent were in poor or very poor condition. As noted in Section 3.4.5 Existing Rangeland Conditions, the 1960's analysis indicated that approximately 37 percent of the rangeland vegetation in the North Rich Allotment alone was determined to be in either good or excellent condition; approximately 49 percent of the rangelands were determined to be in fair condition while about 15 percent were either poor or very poor. Implementing the Revised Forest Plan, however, will result in improved conditions on unsatisfactory condition rangelands in all existing allotments. Livestock grazing in aspen communities adjacent to riparian areas or ponds, where beaver activity has removed much of the aspen overstory can result in a substantial reduction in aspen regeneration. In two areas in the southern portion of the allotment, Bench Pond (approximately 10 acres) and Willow Springs (approximately 25 acres), livestock grazing has apparently eliminated aspen regeneration because of heavy use of aspen sprouts following beaver activity in the area.

Timber Harvest
In the North Rich Allotment, approximately 1,305 acres of timber harvest has occurred. Cumulatively, approximately 1,700 acres in this portion of the Bear River Range have been harvested (Table 4.1). About 60 percent of these acres were harvested using a clear-cut technique, while the remaining were harvested using a partial cut technique, which left a low to moderate density cover of overstory. Some of these partial cut units were subject to wind throw and were left with a low-density overstory.

Some of these harvest units (those prior to the Bear Hodges timber sale) have a high amount of thistle that was brought into the area through timber harvest by vehicles used in the logging process. Additional weeds from livestock use are found in riparian areas adjacent to Saddle Creek and Mill Hollow.

Table 4.1 Timber Harvest Units within the portion of the Bear River Range on the Wasatch-Cache National Forest.

Year Cut	Sale Name	Type Cut[1]	Number of Units	Total Acres
1965	Jebo-Private	CC	1	37
1970	South Sink	CC	3	80
1971	Elk Springs	CC	2	38
1971	Hells Hollow	CC	4	103
1973	Dugway Springs	CC	5	58
1973	Swan Flat	CC	1	33
1973	Swan Flat	PC	3	241
1975	Little Bear	CC	4	77
1975	Spawn Creek	CC	6	44
1977	Log Cabin	CC	2	42
1988	Cheney	PC	1	47
1991	Log Cabin-Dugway	CC	5	25
1991	Log Cabin-Dugway	PC	8	311
1991	State	CC	2	93
1994	Log Cabin Ridge	CC	11	108
1998	Slideout	CC	8	94
2001	Bear Hodges	CC	1	194
2001	Bear Hodges	PC	1	76
			Total	1,701

[1] PC = Partial Cut, CC = Clear Cut

Insects and disease are a potential problem in the high elevation spruce-fir forests within the allotment. Portions of the Bear Hodges timber sale were focused on maintaining these communities as they form an important wildlife corridor from the northern Rocky Mountains to the central Rocky Mountains. The current Bear Hodges II timber sale, in the vicinity of the T.W. Daniels Experimental Forest, is an attempt to limit the effects of future outbreaks and regenerate the spruce component. Engelmann spruce beetle attacked approximately 1,000 acres of spruce-fir stands in 1995 in the vicinity of the Experimental Forest. Aggressive suppression activities were conducted in 1996 and 1997, consisting of removing beetle infested trees and using pheromone traps in an attempt to prevent an increase in the insect population. At the same time, spruce beetle was also rapidly increasing on the Ogden District, extending from Dairy Ridge north to the Spencer Basin area. The same suppression strategy was employed in that area in 1998 and 1999. Both suppression attempts were successful in reducing the populations.

The use of suppression techniques, however, did not dramatically alter the stand conditions, leaving the residual spruce susceptible to further infestation (Bentz and

Munson 2000). A timber sale has been prepared to treat spruce stands Treatment consists of removing small groups of mature trees and planting spruce seedlings, and commercial thinning the surrounding stands to maintain vigor of the trees and reduce their susceptibility to beetle attacks. Examination of the Logan treatment area during the summer of 2002 indicated increased beetle activity with numerous trees showing signs of recent attacks.

Fire

Historic fire suppression has caused many of the plant communities in and around the North Rich Allotment to be mature in age and cover classes. In general, aspen communities in the Bear River Range tend to be older stands with many being replaced by conifers. Mountain big sagebrush and spiked big sagebrush stands tend to have high canopy cover. Natural fires (Edgar and Spawn Creek) and prescribed burns (Red Banks, Rock Creek, and a portion of Boulder Mountain) have resulted in improved conditions as well as increasing the diversity of cover classes of sagebrush and age classes of all communities. In addition, prescribed burns proposed for the near future (Monte Cristo) and the recently burned portion of Boulder Mountain will also improve the conditions and age class diversity of associated rangelands.

The Spawn Creek Fire (a natural fire) of 1988 burned approximately 150 acres, primarily of aspen and Douglas-fir; much of the Douglas-fir had high mortality prior to the burn. Most of this burned area has regenerated to aspen. The Edgar fire in 1994 burned approximately 400 acres of aspen and aspen-conifer, 100 acres of conifer, and 40 acres of sagebrush within the North Rich Allotment. It is estimated that similar acres of aspen and conifer burned outside National Forest land to the east, with much greater amounts of sagebrush acres burned. The aspen and conifer acres burned within the allotment regenerated as aspen-dominated communities. While Fitzgerald and Bailey (1984) noted that heavy livestock grazing in aspen-dominated stands following fire, eliminated aspen regeneration, the livestock grazing that occurred in this area following the Edgar Fire, did not suppress aspen regeneration. DeByle (1985) noted that light grazing in aspen communities with new suckers by cattle (such as that which occurs following fire) was acceptable because their diet consisted primarily of herbaceous materials. Regeneration of aspen has been successful in this area, with trees reaching heights well over 6 feet and densities sufficient to ensure that these stands will be maintained into the future.

The Red Banks prescribed burn in 1997 in Logan Canyon treated approximately 225 acres, primarily of aspen with some sagebrush included. The Boulder Mountain prescribed fires of 1999 and 2003 treated approximately 680 acres, primarily of aspen with some mountain brush as well. Alternatives that include aspen treatment will contribute to increasing the age class diversity in the Bear River Range.

Road and Trail Management

Road and trail management would have no cumulative effect on vegetation conditions in the allotment.

Recreation

Unauthorized use of ATVs on closed and/or ghost roads, or across unroaded areas would degrade vegetation.

Summary

Expected cumulative effects to vegetation with implementation of Alternative A will result in a very slow improvement to current conditions throughout the allotment because of the lower utilization on unsatisfactory condition rangelands. Ground cover would improve at the slowest rate of all alternatives. There would be an expected improvement in vegetation conditions and ground cover with implementation of Alternative B. Implementation of Alternative C would result in the quickest recovery of vegetation and ground cover because of complete rest. Implementation of Alternative D would result in an improvement of current vegetation conditions, but ground cover would improve at a slower rate than Alternative B.

4.7 Effects on Water and Soils Resources

4.7.1 Introduction

This section describes effects of grazing and developments associated with grazing administration for each of the alternatives. The analysis method is to present general direct and indirect effects as described in literature citations and then present, by alternative, the specific effects from livestock grazing and management in the North Rich Allotment. Cumulative effects are analyzed by considering past, present, and foreseeable future actions.

4.7.2 Issues Addressed

The following issues identified in Chapter 1 are addressed in this discussion:

- How would the proposal or any of the alternatives affect the hydrologic function of riparian areas and wetlands, soil and water conditions such as wetland function, soil productivity, stream channel and bank stability, and water quality?

Riparian areas and wetlands are influenced by permanent water and include those areas adjacent to streams, springs, seeps, and wetlands. The effects of cattle grazing on riparian condition can include soil erosion and compaction, the loss of vegetation cover from plant consumption or trampling, breakdown of stream banks, widened stream channels, stream bank sloughing, decreased water depths, and higher water temperatures. Stream corridors are particularly attractive to livestock because they are generally highly productive, provide ample forage, water is close at hand, shade is available, and slopes are gentle. Unless carefully managed, livestock can overuse these areas and cause substantial disturbance.

Riparian areas provide unique habitats for plants and wildlife and serve important water quality and stream stabilization roles. Uncontrolled and sustained heavy use of riparian vegetation can result in decreased plant vigor, decreased structural and species diversity, loss of soil productivity, and a potential loss of habitat for wetland-dependant species.

- How would the alternatives affect soil productivity of uplands within the allotment?

Extensive loss of ground cover from heavy grazing can increase runoff and erosion of topsoil by exposing surface soil aggregates to damage and transport from raindrop impact. Excessive soil compaction can reduce water infiltration, resulting in drier soils and harsher conditions that may favor weedy or undesirable plant species. A qualitative analysis will be used to describe how each alternative affects soil stabilizing vegetative ground cover and, by extension, soil productivity.

Measurement indicators used to compare alternatives:

a. The amount and rate of improvement of degraded soil, water, and riparian conditions where they exist, through implementation of the proposed action or alternatives to it

b. The rate and degree to which soil productivity is improved by the proposed action or alternatives to it

4.7.3 Effects Analysis Methods and Assumptions

Baseline conditions were determined through review of literature and field observations. Field observations were conducted to characterize watershed, soil, wetland and riparian conditions in the North Rich Allotment. To compare the environmental effects by alternative it was necessary to make a few key assumptions. These were:

- Range administration would assure that stubble height and utilization thresholds would not be exceeded.
- Improvements, fences, and off channel water developments are constructed on schedule and maintained to standard.

4.7.4 Direct and Indirect Effects

4.7.4.1 General Description of Effects

Livestock grazing has the potential to adversely affect riparian and stream conditions in several ways. The primary impacts that result from grazing domestic livestock are the loss of vegetative cover because of consumption, and trampling and stream bank erosion from the presence of livestock. Stream corridors are particularly attractive to livestock because they are generally highly productive, provide ample forage, water is nearby, shade is available, and slopes are gentle. Unless carefully managed, livestock can overuse these areas and cause substantial disturbance (Federal Interagency Stream Restoration Work Group 1998).

In upland and riparian areas, extensive loss of ground cover and soil compaction from heavy grazing can increase runoff and erosion of topsoil by exposing surface soil aggregates to damage and transport from raindrop impact (Holechek et al. 2001). With heavy grazing, soil compaction can degrade soil hydrologic function and productivity to the point where dry upland species are favored over phreatic plants, and weedy annuals out compete perennial forbs.

The direct effects of livestock grazing are the removal of vegetation, trampling of vegetation, destruction of biological soil crusts, compaction of underlying soils, and redistribution of nutrients. The indirect effects are altered runoff, infiltration rates, and soil water-holding capacity; accelerated erosion; changes in vegetation structure,

productivity and composition; altered stream channels; changes in water quality; and frequency and severity of fire (National Research Council 2002).

4.7.4.2 Alternative A (No Action – Current Management)

Under Alternative A, permitted livestock numbers, season of use, amount of utilization that is allowed for satisfactory condition rangelands, and grazing system remain the same as existing conditions. Alternative A would not result in any direct or indirect effects to the existing soil and water conditions as described in Chapter 3, except where the WCNF Revised Forest Plan has lowered the utilization standard for unsatisfactory condition rangeland. This would result in improvement over current conditions in these areas.

Season-long grazing system would continue and would result in continued degradation to riparian areas and wetlands because there would be no rest or recovery of vegetation. Holechek et al. (2001, pages 249, 277) describe season-long grazing and other grazing systems in regard to their affect on riparian and wetland areas:

> "On mountain areas, season-long or continuous grazing generally results in degradation of areas convenient to livestock even under light grazing … Continuous or season-long grazing is most damaging to streamside areas (riparian zones) and wetlands because livestock concentrate and linger on these areas due to the convenience of forage, water, and cover (Gunderson 1968; Evans and Krebs 1977; Severson and Boldt 1978)."

4.7.4.3 Alternative B (Proposed Action)

For the factors of season of use and the amount of utilization that is allowed, the effect on soil and water resources would remain the same as in Alternative A. Alternative B reduces permitted livestock numbers by about 1/3, but also reduces the amount of land available to livestock use by a similar amount. Therefore, there would be no net changes to the effects on soil and water resources as a result of permitted livestock numbers.

Alternative B would implement a rest rotation three pasture grazing system with a more intensive herding of livestock. Since one pasture is rested each year, we expect to see improvement in ground cover and associated reductions in soil erosion and sedimentation. Because herding will move livestock away from riparian areas to upland areas, riparian vegetation should increase, bank trampling should decrease, and overall stream channel stability should improve. Herding will move livestock into areas that are currently not used or underused, resulting in lighter overall use of vegetation and very little effect to upland soil conditions.

Holechek et al. (2001) describe rest-rotation grazing systems and compare it to other systems in regard to their effects on uplands and riparian areas. This information is summarized below:

"Rest rotation grazing has shown superiority to season long grazing on ranges where livestock distribution problems occur. ...In northeastern California, rest-rotation grazing resulted in higher vigor of the key forage plant, Idaho fescue, (*Festuca idahoensis*), than that resulting from continuous grazing (Hormay 1970; Ratliff et al. 1972; Ratliff and Reppert 1974). On mountain range in Wyoming, range condition improved more under rest-rotation than under deferred-rotation grazing (Johnson 1965). In eastern Utah season-long and rest rotation grazing had similar influences (Laycock and Conrad 1981)." (Holechek et al. 2001, p. 266).

"On mountain riparian meadows in northeastern Oregon, rest-rotation grazing resulted in better soil properties (higher infiltration, reduced bulk density, and reduced sediment) than deferred grazing and season-long grazing" (Holechek et al. 2001, p. 266).

"... rest-rotation if used with a conservative stocking rate is a good system for both vegetation and livestock in rugged, mountainous terrain. This system will, in most cases, improve grazing capacity over season-long grazing due to better livestock use of upland areas and improved vegetation vigor and composition in the more productive riparian zones" (Holechek et al. 2001, p. 267).

"... rest-rotation appears to be one of the most practical means of restoring and maintaining riparian zones. It is well established that under moderate stocking rates this system improves both streamside vegetation and physical characteristics (Hayes 1978; Davis 1982; Platts 1982; Bohn and Buckhouse 1985)" (Holechek et al. 2001, p. 277).

"On some ranges herding of cattle can improve distribution. ... In mountainous terrain, herding of cattle to areas with poor accessibility but adequate feed has improved uniformity of use (Skovlin 1957). Herding has been most effective where cattle were driven from lowland bottoms to upland benches and ridges that have available water in the form of springs and seeps. Once cattle become aware of these areas, they will be readily utilized even though steep terrain may hinder access." (Holechek et al. 2001, p. 303)

Proposed projects will indirectly effect soil and water conditions on the allotment by improving vegetative cover, reducing soil erosion and soil movement to streams, and protecting stream channel banks and riparian areas. Projects include fencing to exclude cattle from riparian areas to increase riparian vegetation, eliminate bank trampling, and improve stream channel stability; treating tarweed areas to improve ground cover and vegetation composition; seeding soil with low ground cover and reducing sagebrush in order to increase ground cover with grasses and forbs; and rejuvenating aspen and old mountain brush areas through use of prescribed fire.

The direct effects to soil and water resources from implementing proposed projects on the allotment are described below.

- Fencing - installing fence at Government Spring and the head and middle parts of Hells Hollow exclosure. The installation of wire fence involves pounding 2-inch diameter metal posts into the ground about every 20 feet and will cause very little soil disturbance, only around the stake, and no measurable movement of sediment is expected. There would be no effects to soil resources from installing buck and pole fencing because no soil disturbance occurs. This would occur on 16 acres of riparian area within the allotment.

- Sagebrush treatments (mechanical or chemical) and seeding – Direct effects to soil resources from treating about 600 acres in Middle, Peter, and South Sinks will be the physical displacement of soil from the use of heavy mechanical equipment. No compaction effects are anticipated due to the extremely rocky nature of soils in the treatment areas. There would be no direct or indirect effects to soil productivity from the chemical treatments because of the non-persistent nature of the herbicides being used within the soils. Indirect effects to the soil include the potential for some soil erosion for a period of about one year due to the removal of existing vegetation. After the first year of treatment, denser ground cover is expected to grow and protect the soil from erosion.

- Tarweed treatment (mechanical or chemical) and seeding – Direct effects to soil resources from treating about 50 acres in Upper Jebo and South Sinks will be the physical displacement of soil from the use of heavy mechanical equipment. No compaction effects are anticipated due to the extremely rocky nature of soils in the treatment areas. There would be no direct or indirect effects to soil productivity from the chemical treatments because of the non-persistent nature of the herbicides being used within the soils. Indirect effects to the soil include the potential for some soil erosion for a period of about one year due to the removal of existing vegetation. After the first year of treatment, denser ground cover is expected to grow and protect the soil from erosion.

- Aspen regeneration (prescribed fire) – There would be no direct or indirect effects to soil productivity from treating about 800 acres in the Cheney-Richardson, Hodges, South Peter Sink, and Brush Creek areas with a light to moderate severity prescribed burn. Bradley et al. (1992, pages 3-5 and 35) found that moderate prescribed fire can rejuvenate aspen stands, and further described a moderate fire as burning surface fuels, litter, and the upper duff layer of the soil. Because lower duff layers remain unaltered under this type of fire, they concluded that "properly applied, prescribed fire has a low risk of long-term adverse effects on the fertility of most common Utah soils."

4.7.4.4 Alternative C (No Grazing)

The direct effects of the no grazing alternative on soil and water resources would be a slow improvement to ground cover in most uplands, reduced soil compaction and stream bank trampling, and reduced amounts of nutrients from animal waste and sediment

directly entering streams and ponds. There would be very little, if any, recovery of ground cover conditions in historic tall forb communities. The indirect effects would be reduced runoff and increased infiltration rates, reduced erosion rates, increased stability of stream banks and riparian areas, and a general improvement in water quality (Vallentine 1989, p. 168).

For riparian areas, the National Research Council (2002) describes the passive restoration approach as the exclusion of domestic livestock from riparian areas via fencing, herd management, or other approaches. It states, "Excluding cattle from riparian areas is the most effective tool for restoring and maintaining water quality and hydrologic function, vegetative cover and composition, and native species habitats." Within the allotment, the riparian areas would be expected to improve the fastest of all areas of the allotment because of the water that is available year-round. Some areas of the allotment will take many years to recover fully, such as overgrazed uplands adjacent to springs and ponds.

4.7.4.5 Alternative D (Two Pasture, Deferred Rotation)

The range management principles described by Holechek et al. (2001) stress the importance of maintaining vegetative residue in order to protect the soil from erosion due to dislodgement from raindrops. The authors compare season-long grazing to deferred grazing and state that vegetation response under deferred grazing is slightly to moderately better than season-long grazing in mountain coniferous forest ranges. They also state that some researchers found that "On mountain ranges, stringer meadows and riparian zones will often receive excessive use by cattle even under light grazing intensities, while surrounding uplands will receive little or no use".

Under Alternative D, effects to riparian and wetland areas where specific improvements are implemented would be the same as Alternative B. Water quality is expected to be similar to Alternative B where fencing would exclude livestock. Water temperatures and nutrient levels in these areas would decrease because of the increased overhanging bank vegetation and the removal of livestock waste directly in the riparian zone. The soil and water conditions in unfenced riparian areas should be about the same as Alternative B. There may be a slight improvement in riparian conditions in the rested pasture, since riparian areas would have rest during part of the growing season.

Under Alternative D, effects on upland soil productivity would be similar to Alternative A (No Action) except it is expected that a slight increase in vegetative residue may occur compared to the current season-long grazing system. Holechek et al. (2001) states this is because "deferred rotation provides a better opportunity for preferred plants and areas to maintain and gain vigor than does continuous grazing". The effects on upland soil productivity of implementing specific improvements would be the same as the Alternative B, the Proposed Action.

4.7.4.6 Summary and Comparison of Alternative Effects

All of the alternatives are expected to result in an upward trend in soil stabilizing vegetative ground cover. The differences between alternatives are mainly in the rate at which this upward trend occurs, and the length of time it will take for rangelands with unsatisfactory ground cover to reach desired future conditions.

Implementation of the proposed action avoids most, but not all, of the adverse impacts of livestock grazing to soil and water quality that are described in this analysis. Although grazing will continue to affect ground cover, the Revised Forest Plan standards for this condition will be met under the proposed action and soil erosion would be kept at allowable levels. Trampling of stream banks, entry of nutrients from animal waste and sediment directly into streams and ponds, and degradation of riparian areas will continue to occur occasionally, but will be greatly reduced by more intensive herding practices.

Overall, Alternative A presents the poorest choice for improving soil and water conditions, because there are no changes from the existing management with the exception of reduced utilization in unsatisfactory condition rangelands.

For Alternatives B, C and D, overall effects on soil and water conditions are best illustrated in the rate at which improvement would occur in riparian and upland areas. Alternatives B and D would result in rapid improvements to soil and water conditions, but only for those upland and riparian areas that receive treatments. With Alternative C, upland conditions will improve gradually in specific areas such as aspen communities. All riparian areas would improve the fastest under Alternative C.

4.7.5 Mitigation

No additional mitigation is required for the protection of soil and water resources because the management requirements (Section 2.5) will implement practices that will have the effect of improving soil and water quality.

4.7.6 Unavoidable Adverse Effects

No unavoidable adverse effects are expected.

4.7.7 Short-term Uses vs. Long-term Productivity

Historic overgrazing has degraded the condition of the soil and water resources in the allotment. Continued grazing under Alternative A would allow for the recovery of long-term productivity on those rangelands currently in unsatisfactory condition. The land treatments associated with continued grazing under Alternatives B and D would result in improvements to long-term productivity, but only for those upland and riparian areas that receive the treatments. With the cessation of grazing under Alternative C, long-term productivity will improve in specific areas such as aspen communities and riparian areas.

4.7.8 Irreversible and Irretrievable Commitments

Should the proposed action be implemented, there will be no irreversible/irretrievable commitments of soil or water resources. This analysis has shown no adverse effects as a result of the proposed action, and discloses many situations where soil and water quality will be improved.

4.7.9 Cumulative Effects

The approach for this cumulative effects analysis is to review past, present, and reasonably foreseeable activities that may positively or negatively affect soil and water resources. The cumulative effects analysis for soil, water, and geologic resources considers the size and magnitude of activities that affect soil and water resources, either positively or negatively.

Area of Influence

For soil resources, the cumulative effects area is the North Rich Allotment because the productivity of the soils is confined to the allotment area.

For water resources cumulative effects, the area of influence is the area affected by the grazing management of the North Rich Allotment and/or affected by the proposed projects. In the Bear Lake drainage, it is the area above the point where streams are diverted for irrigation purposes; for the most part, this is located at the Forest Boundary.

In the Saddle Creek drainage, it is the area above the point where beaver ponds are located at the allotment boundary in the Hells Hollow exclosure. This point is chosen because it is where water quality changes due to beaver activity, including large decreases in stream sediment which tend to drop out in the ponds and increased bacteria due to presence of beaver.

For the Logan River drainage, it is the area within the allotment boundary. This area includes the very upper area of Brush Creek, Rigby Hollow, Little Bear Creek, West Hodges Creek, Spawn Creek, Temple Fork, and Right Hand Fork in Logan Canyon. The reason for using this analysis area is because these areas are small in size and management of these areas has a small effect on the soil and water conditions of the watersheds in which these areas are located.

Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action

Existing conditions are the result of past and ongoing management activities such as forest roads, fisheries management, forest and rangeland management, recreation management, as well as natural processes. The interdisciplinary team identified past,

present, and future ground disturbing activities (see Appendix J). Past activities that have affected soil and water resources include:

1. Livestock grazing in the North Rich Allotment and adjacent allotments since the late-1800s – High impacts to soil and water resources occurred from the late 1800s through the 1930s when active grazing management took effect in this area. A gradual improvement in land conditions have occurred as indicated by the increased ground cover from the time when Albert Potter traveled through the area in 1905 and absence of active soil erosion in most areas of the North Rich Allotment and surrounding grazing allotments.

2. Historic timber harvest – much of the timber in this part of the Bear River Range was harvested in the late 1800s. More recent timber harvest has occurred in the lodgepole pine areas of the central part of the allotment. Currently, the harvest areas have been restocked and show very little soil erosion.

3. Wildfire in Edgar Canyon (1994) and Spawn Creek (1988) directly west of the allotment – Vegetation has grown back in these areas and no adverse soil effects have been noted from these fires.

4. Wildlife prescribed burns – In 1997, the Red Banks prescribed fire was conducted just west of the North Rich allotment in Logan Canyon. The burn followed the fire prescription determined for this area, and monitoring has shown rapid growth of vegetation following the fire and no evidence of erosion or sedimentation.

5. Travel plan implementation and use of roads and trails – The original roads and trails in this area were established by the users without consideration for minimizing effects to soil and water. The Forest Service has relocated the main road through the allotment and has established proper drainage. Many old roads and user-created roads have been closed in this part of the Wasatch-Cache National Forest.

6. Hells Hollow Riparian Fence – Since 1995 when a fence was installed around this area, the riparian area has improved with overhanging bank vegetation, narrowing of the channel, and establishment of new willows on point bars.

7. Treatments for noxious weeds – Chemical spraying of noxious weeds have been conducted according to proper protocols and no adverse effects to soil and water have been observed.

Reasonably foreseeable activities that may affect soil and water resources include:

1. Bear Hodges II Timber Sale (referred to as the X-4 Timber Sale in the DEIS, spruce thinning and regeneration on the Daniel Experimental Forest, FEIS to be completed in 2004) – the environmental analysis for this project indicates that

very little to no effects to soil and water resources will occur because of the small areas and dispersed locations where treatments will occur.

2. Travel Plan to be updated within 5 years – This plan will evaluate motorized travel in the North Rich area and will make recommendations for road locations and include consideration for improving soil and water resource conditions.

3. ATV trail – this project will provide an ATV trail through northern Utah. Effects on soil and water resource conditions will be monitored and soil and water conservation measures will be provided that will minimize adverse effects from the project.

4. Riparian improvement projects involve riparian fences at Tin Cup Spring, Mill Hollow, Saddle Creek, and Jebo riparian areas and provide livestock water in troughs away from riparian areas. These riparian fencing projects are planned or have been completed under a Decision Memo signed by District Ranger Rob Cruz on March 4, 2003. The Tin Cup Spring riparian fence was completed in fall 2003. The second project is planned for Jebo Springs. The final project is underway at Mill Hollow Springs. This project should improve water quality and riparian conditions in Mill Hollow and in turn provide an improved buffer for Saddle Creek.

Summary

For all alternatives, under the past activities list, items 4-6 have shown a positive improvement to soil and water resources; item 1 had a high impact on resources in the distant past but conditions have been slowly improving through better livestock management; and items 2, 3 and 7 currently have a no effect on soil and water resources because these areas have recovered from the effects of the activity.

Under the reasonable foreseeable future activities list, item 1 has no effect on soil and water resources; and items 2, 3, and 4 have a positive effect on soil and water resources because of proposed improvements and inclusion of soil and water conservation measures.

The cumulative effects of Alternative A with past and reasonable foreseeable future activities would show a small amount of improvement to soil and water resources because of the lower utilization standards for unsatisfactory rangelands.

Cumulatively, the effects of Alternative B, along with the effects of past and reasonable foreseeable future activities shown above, would improve soil and water conditions, primarily because of the implementation of fencing projects, rest rotation grazing, and herding practices. This would include a slow improvement to ground cover and soil productivity in upland areas and most riparian areas, and a fast improvement to specific riparian areas that will be excluded from livestock grazing by fencing.

The cumulative effects of Alternative C with past and reasonable foreseeable future activities would show a slow improvement to soil and water conditions in aspen communities, and very little improvement in sage/grass or historic tall forb areas. After three years, when grazing has ceased, there would be a more rapid improvement to all riparian areas.

Cumulatively, the effects of Alternative D, along with the effects of past and reasonable foreseeable future activities shown above, would slightly improve soil and water conditions, primarily because of the implementation of fencing projects, deferred rotation grazing, and herding practices. This would include a slow improvement to ground cover and soil productivity in upland areas and non-fenced riparian areas, and a more rapid improvement to specific riparian areas that will be fenced.

4.8 Effects on Wildlife

4.8.1 Introduction

This section describes the effects of grazing and the proposed treatments on wildlife species that would result from grazing the North Rich Allotment under the different alternatives as described in Chapter 2.

4.8.2 Issues Addressed

Public and agency scoping, followed by Forest Service interdisciplinary team review, identified the following issue to be addressed in this analysis:

- How will the proposed action and the alternatives affect wildlife species and their habitats? This includes USFWS listed Threatened, Endangered, Proposed, and Candidate species, USDA Forest Service Sensitive species, Management Indicator Species (MIS), and general species of local concern.

Measurement indicators used to compare alternatives:

a. The degree to which threatened or endangered wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives

b. The rate and degree to which sensitive wildlife species and their habitats found in the North Rich Allotment are affected by the proposed action or alternatives

c. The degree to which neotropical migratory birds are affected by the proposed action or alternatives

4.8.3 Effects Analysis Methods and Assumptions

Baseline conditions were determined through review of literature and field surveys and observations. Field surveys were conducted to identify and quantify wildlife species and populations, and to characterize habitat conditions in the North Rich Allotment. To compare the environmental effects by alternative it was necessary to make these key assumptions.

- The combination of a rest-rotation pasture system and the implementation of utilization standards on unsatisfactory rangeland at the 30-40 percent use level will maintain forage production and move conditions toward desired by increasing understory species diversity within aspen stands and returning conditions to a more native species composition.

- Under the "no grazing alternative" and/or within the proposed exclosures identified within Alternatives B and D, for this analysis it is assumed that light

grazing by native ungulates and other native herbivore species would maintain plant vigor and therefore, vegetation production would not be reduced.

- Utilization standards included in the Revised Forest Plan (and implemented with this project) are to maintain critical minimum residuals to protect soil, forage plant vigor, livestock diet quality, and wildlife habitat. The utilization standards would represent the percentage of use for key species at moderate grazing levels. Stubble height and utilization standards are measured on a timely basis and actions to remove livestock are implemented before standards are exceeded.

- Monitoring is conducted as identified in the allotment management plan and changes are made when conditions are not favorable or are moving away from desired future condition.

- Improvements (such as fences and vegetation treatments) that are approved are completed on schedule and maintained to standard.

- Livestock are directed toward the use of suitable uplands through strategic salting and intensive riding, thus reducing pressure on riparian habitat, springs, and wet meadows.

4.8.4 Direct and Indirect Effects

General Description of Effects

Livestock grazing can affect vegetation used by wildlife in several ways. In most instances livestock grazing does not change the forest type, but influences factors such as understory vegetation cover, forage, and species composition. Alternatives B and D, through prescribed burning and sagebrush treatments, are the only alternatives that will bring about a direct change in vegetation age class structure within the northern portion of the allotment. This would benefit species that prefer and use vegetation in early successional stages. Livestock and big game can influence aspen regeneration and also influence the occurrence of fire and its frequency in forested stands (see Vegetation, Section 4.6). Livestock use over time has changed the understory species composition within many aspen stands in the allotment, leaving unpalatable species, such as coneflower. Livestock grazing has also reduced hiding and nesting cover for species that depend on cover for security. In general, livestock grazing has decreased vegetative structural diversity in portions of the allotment, particularly those in riparian and aspen areas in unsatisfactory condition. Generally, a decrease in vegetation structure and species composition results in a decrease in wildlife diversity. These topics will be the primary focus of this analysis.

With the implementation of the Revised Forest Plan and the standard for 30 to 40% utilization for rangeland in unsatisfactory condition, all alternatives will improve conditions for most wildlife species to some degree.

Alternative C (the No Grazing Alternative) would have the most benefit for most wildlife species because it would increase vegetation understory structure and forage for wildlife across the entire area. This alternative would produce an increase in understory vegetation structure (for cover) and the amount of available forage for wildlife species, but would provide slow improvement in upland vegetation diversity and changes in upland species composition. Changes would be slow without some type of disturbance, such as fire, mechanical treatment, or chemical treatment.

Alternative B (the Proposed Action) includes vegetation treatments in sagebrush, tarweed, and aspen communities that will improve upland vegetation diversity. Vegetation structure and the amount of available forage for wildlife will be moderately increased by implementation of a rest rotation system, reduced permitted livestock numbers, installation of riparian exclosures, and changes in utilization standards for rangelands in unsatisfactory condition. The proposed action implements of the recommendations developed by Chaney et al. (1990) for the improvement of riparian habitat conditions. Alternative B would rest 1/3 of the allotment and install riparian exclosures, increasing vegetation understory structure and available forage for wildlife in a portion of the area. Concentrating livestock into two pastures within the allotment and reduction in numbers of livestock may allow herders to improve the distribution of cattle within the area, thus reducing impacts to riparian, wet meadows, springs, and adjacent vegetation.

Alternative D (the two pasture, deferred rotation alternative) would be comparible to Alternative A with slight improvements in understory vegetation structure (cover) and the amount of available forage for wildlife. Alternative D would not rest any portion of the allotment and not change permitted numbers of livestock; thus improvement in vegetation diversity and in species composition would be slow. The implementation of a deferred rotation system would concentrate livestock within each pasture for a shorter period of time, thus one pasture would be grazed early in the summer while the other would be grazed later. The pasture utilized early may show some recovery of vegetation conditions (cover and forage) for wildlife once cattle are removed, though this is dependent on when cattle are removed and if weather conditions provide moisture for vegetation regrowth and recovery. The pasture utilized later would provide cover and forage benefits for the early portion of the summer for wildlife species. Concentrating livestock into a small portion of the allotment may allow herders to improve on the distribution of cattle within the area and thus reduce impacts to riparian, wet meadows, springs, and adjacent vegetation. This alternative includes vegetation treatments in sagebrush and aspen communities that will improve upland vegetation diversity. For the protection of treated areas, Alternative D would likely include fencing (primarily temporary electrical fence) to protect these sites from livestock.

4.8.4.1 General Wildlife

The discussions below include general wildlife species including game species, small mammals, and the gray wolf.

Mule deer

Very little winter range occurs within the North Rich Allotment, thus, effects are primarily on summer range habitat. Summer range within the Cache Harvest Unit is not a limiting factor for deer populations. Factors which have been identified as key factors in the decline of mule deer on the Cache Harvest Unit are as follows: decreased carrying capacity on winter ranges, increased human population impacts, changes in livestock grazing practices on winter range, increased effects of predators, and competition from elk on winter range, and changes in public values regarding management tools (UDWR 1999).

Alternative A (No Action – Current Management)

Livestock grazing would continue to reduce summer range forage and the quality of available forage to deer across the allotment. However, this may not influence deer or deer populations since they are mainly affected by the availability of suitable winter range within the Cache Harvest Unit. The implementation of the standard of 30-40% utilization for rangeland in unsatisfactory condition will make some improvement to vegetation understory conditions (see Section 4.6).

Barbed wire allotment boundary fences could continue to result in minor losses of deer by entanglement, but this would not cause noticable changes to deer numbers.

Alternative B (Proposed Action)

This alternative would improve summer range forage and the quality of available forage to deer for a portion of the allotment, although this would not likely influence actual deer numbers since the population is most influenced by the availability of suitable winter range within the Cache Harvest Unit. This alternative will rest one of the three pastures. Mule deer have shown a preference for and may use a rested pasture more so than a grazed portion of the allotment (Ragotzkie and Bailey 1991).

Within sagebrush treatment areas, deer forage may be reduced in the short-term. However, overall use of treated areas will actually increase, since a greater amount and higher quality of forage is usually available after treatment of decadent sagebrush.

This alternative would install more let-down fence than the other alternatives because there would be two pasture fences. Barbed wire allotment boundary and pasture let-down fences could continue to result in minor losses of deer by entanglement, but like Alternative A, this would not cause noticeable changes to deer numbers.

For Alternative B, less fencing would be required for the protection of treated areas. Individual treatement areas would not need fencing since the north pasture would be rested and all vegetation treatments are within north pasture. Buck and pole or worm fences where used for riparian exclosures will allow access to and egress from springs and riparian areas.

Alternative C (No Grazing)

Livestock grazing and associated effects as described in Alternative A would continue for three years. Then, grazing would be discontinued, allowing for the recovery of vegetation conditions and increases in the amount and quality of available forage for deer. This alternative would improve forage conditions. However, actual deer numbers will not likely be influenced since the population is most directly affected by the availability of suitable winter range within the Cache Harvest Unit.

Alternative D (Two Pasture, Deferred Rotation)

This alternative would slightly improve summer range forage and the quality of available forage to deer for a portion of the allotment. This would not likely influence actual deer numbers since the population is most influenced by the availability of suitable winter range within the Cache Harvest Unit. The pasture utilized early may show some recovery of vegetation forage conditions for deer once cattle are removed, though this is dependent on when cattle are removed and if weather conditions provide moisture for vegetation regrowth and recovery. The pasture utilized later would provide forage benefits for the early portion of the summer for deer.

Within sagebrush treatment areas, deer forage may be reduced in the short-term. However, overall use of treated areas will actually increase, since a greater amount and higher quality of forage is usually available after treatment of decadent sagebrush.

Barbed wire allotment boundary and pasture let-down fences could continue to result in minor losses of deer by entanglement, but like other alternatives, this would not cause noticeable changes to deer numbers. The amount of pasture fence would be less than Alternative B, but temporary fencing needed to protect treated areas would be more than Alternative B. Buck and pole or worm fences where used for riparian exclosures will allow access to and egress from springs and riparian areas.

Elk

Elk populations are mostly limited by the availability of suitable winter range and are managed at or near population management objectives by hunter harvest. Very little elk winter range occurs within the North Rich Allotment. Summer range, although affected to some degree by grazing, is not a limiting factor for elk populations within the Cache Harvest Unit.

Alternative A (No Action – Current Management)

Livestock grazing would continue to reduce summer range forage and the quality of available forage to elk across the allotment, though this would not likely influence elk populations, since they are at population management objectives within the Cache Harvest Unit. The implementation of the 30 to 40% utilization standard for rangeland in unsatisfactory condition will make minor and slow improvement to vegetation understory conditions. Riparian areas which are used by elk for forage, watering, and as wallows

will continue to be affected by livestock grazing. Barbed wire allotment boundary fences could continue to cause occasional losses of elk by entanglement, but this will not substantially affect the elk population.

Alternative B (Proposed Action)

Riparian exclosures will protect some of the riparian areas which are used by elk for forage, watering, and as wallows. Aspen prescribed burns will increase aspen sapplings and suckers available for elk. Understory vegetation diversity, especially within mature aspen stands, will increase with a combination of rest, reduction in livestock numbers, and the implementation of the 30- to 40% standard for utilization on rangeland in unsatisfactory condition. Palatable forb species used by elk will be more abundant. This alternative would improve forage conditions, though this may not influence actual elk numbers since they are likely limited by the availability of suitable winter range and are managed at or near population management objectives by hunter harvest.

This alternative would install more let-down pasture fence than the other alternatives. Barbed wire allotment boundary and pasture let-down fences could continue to result in minor losses of elk by entanglement, but like Alternative A, this would not cause noticeable changes to elk numbers. For Alternative B, less fencing may be required for the protection of treated areas, since this alternative would rest the north pasture (all vegetation treatments are within the north pasture). Buck and pole or worm fencing used for riparian exclosures will allow access to and egress from springs and riparian areas.

Alternative C (No Grazing)

Grazing will be discontinued after three years, allowing for the recovery of vegetation conditions and increases in the amount and quality of available forage. However, this will not influence actual elk numbers since they are most limited by the availability of suitable winter range and are managed at or near population management objectives by hunter harvest. Since understory vegetation diversity within mature aspen stands will slowly increase, palatable forb species used by elk will become more abundant. Riparian areas used by elk for forage, watering, and as wallows will no longer be affected by livestock grazing.

Alternative D (Two Pasture, Deferred Rotation)

This alternative would slightly improve forage conditions. The pasture utilized early may show some recovery of vegetation forage conditions for elk once cattle are removed, though this is dependent on when cattle are removed and if weather conditions proved moisture for vegetation regrowth and recovery. The pasture utilized later would provide forage benefits for the early portion of the summer for elk. This may not influence actual elk numbers since they are mostly limited by the availability of suitable winter range and are managed at or near population management objectives by hunter harvest.

Barbed wire allotment boundary and pasture let-down fences could continue to result in minor losses of elk by entanglement, but like Alternative A, this would not cause noticeable changes to elk numbers. The amount of pasture fence would be less than Alternative B. Alternative D would include temporary fencing to protect treated areas from livestock. Aspen prescribed burns will increase aspen saplings and suckers available for elk. Buck and pole or worm fences where used for riparian exclosures will allow access to and egress from springs and riparian areas. Riparian exclosures will protect some of the riparian areas that are used by elk for forage, watering, and as wallows.

Moose

Moose numbers on the Logan District are currently near carrying capacity and within Utah Division of Wildlife Resources (UDWR) management objectives (see Section 3.9.2.1.). No substantial change in moose numbers is expected with any of the alternatives.

Alternative A (No Action – Current Management)

Livestock grazing would continue to reduce summer and winter range forage (primarily willows) and the quality of available forage to moose across the allotment, particularly during late summer when cattle are more likely to use browse species. Riparian areas used by moose for forage and watering would continue to be affected by livestock grazing. Barbed wire let-down allotment boundary fences could continue to cause occasional losses of moose by entanglement, but this will not affect overall population size.

Alternative B (Proposed Action)

Like under Alternative A, livestock grazing would continue to reduce summer and winter range forage and the quality of available forage to moose. Riparian exclosures will protect some of the riparian areas used by moose for forage and watering. Prescribed burns within aspen stands will increase young aspen used as browse by moose. Browse forage (willow) will be more abundant and available for moose within the rested pasture. Barbed wire pasture, allotment boundary, and riparian let-down fences could continue to cause occasional losses of moose by entanglement but this will not affect overall population size. Buck and pole or worm fencing associate with riparian exclosures will allow access to and egress from springs and riparian areas.

Alternative C (No Grazing)

Livestock grazing would continue to reduce summer and winter range forage and the quality of available forage to moose across the allotment for three years. Then, grazing will be discontinued, allowing for the recovery of vegetation conditions and increases in the amount and quality of available forage. Riparian areas that are used by moose for forage and watering will no longer be affected by livestock grazing. This alternative

would improve forage conditions for moose, especially within riparian areas, which will recover faster than uplands.

Alternative D (Two-Pasture, Deferred Rotation)

Like under Alternative A, livestock grazing would continue to reduce summer and winter range forage and the quality of available forage to moose. Riparian exclosures will protect some of the riparian areas used by moose for forage and watering. Effects to willows may be reduced within the pasture utilized in the early summer, since cattle are more likely to use browse species during late summer. Prescribed burns in aspen stands will increase young aspen used as browse by moose. Barbed wire pasture and allotment boundary fences could continue to cause occasional losses of moose by entanglement but this will not affect overall population size. Buck and pole or worm fencing associate with riparian exclosures will allow access to and egress from springs and riparian areas.

Grouse

Vegetation cover, particularly aspen for ruffed grouse and sagebrush for blue grouse, is important for both nest security and for the protection of broods (Landry 1982, and Weber 1975). The greater sage grouse, recently added to the Intermountain Region Sensitive Species List, is discussed in Section 4.8.4.5.

Alternative A (No Action – Current Management)

Grouse numbers will not likely change from the current condition, although livestock grazing under this alternative would continue to affect cover vegetation for nesting and brood habitat for grouse. The implementation of the 30 to 40% utilization standard for rangeland in unsatisfactory condition will make some improvement to vegetation understory conditions.

Alternative B (Proposed Action)

Blue grouse numbers would not change much in the short term but may slightly increase in the long term. Livestock grazing under this alternative would continue to affect cover vegetation for nesting and brood habitat for grouse within the non-rested portion of the allotment. The rested pasture would have greater cover during both the nesting and brood rearing stages, thus increasing nest success and survival. Prescribed fire treatments in aspen resulting in young, densely regenerating aspen stands with a well-developed understory will improve habitat conditions for ruffed grouse. A small increase in grouse numbers could occur as a result. Treatments in sagebrush would improve age class and structural diversity, thus reducing habitat in the short term but benefiting the blue grouse in the long term.

Alternative C (No Grazing)

Livestock grazing under this alternative would continue to affect cover vegetation for the grouse across the allotment for three years, until grazing is discontinued and vegetation cover increases. An increase in cover would likely improve nest success and increase survivorship, which could lead to higher population numbers of grouse across the allotment.

Alternative D (Two Pasture, Deferred Rotation)

It is expected that blue grouse numbers would not change much in the short term but may slightly increase in the long term. This alternative would treat sagebrush areas in the northern portion of the allotment. Age class and structural diversity would be improved within sagebrush areas, thus reducing habitat in the short term but benefiting the blue grouse in the long term. Prescribed fire treatments in aspen, resulting in young, densely regenerating aspen stands with a well-developed understory, will improve habitat conditions for ruffed grouse. A small increase in grouse numbers could occur as a result. Livestock grazing under this alternative would continue to affect cover vegetation for nesting and brood habitat for grouse within the allotment. One-half of the allotment (late summer grazed portion) would have greater cover during the nesting stage and a portion of the brood rearing stage. This would increase nest success.

Small Mammals

The effects of livestock grazing on small mammals vary considerably among species because of their differing habitat requirements. Ground squirrels are highly adaptable and use a variety of environments, mostly open, non-forested areas. The exception is that of the golden mantled squirrel which uses open forests. Ground squirrels primarily eat plant material. Chipmunks and tree squirrels primarily use seeds as food and are most common in forested environments. Shrews are primarily insectivores and usually are tied closely to moist habitats with high amounts of vegetation cover such as riparian areas and meadows. Most mice use a variety of foods resources such as insects, seeds, and plant material and utilize a variety of habitat types. Voles primarily use plant material for food and usually are found in moist habitats such as riparian areas and meadows. Gophers use both forested and non-forest habitats and eat plant material such as roots and tubers for food.

The results of small mammal studies vary when comparing areas grazed by livestock and those with no livestock (Johnson 1982, Medin and Clary 1990, Douglass and Frisina 1993, Heinowski 1982, Wagner et al 1980, Cherry 1981, and McCluskey 1978). Studies tend to display a shift in species composition with species that show preferences for more open understories, such as the deer mouse, increase in abundance with livestock grazing, while those species that require greater cover, such as the vole, decrease. Small mammal abundance varies by study (sometimes even by year within the same study) with some displaying equal abundance between grazed and ungrazed areas and other studies indicating declines in overall small mammal abundance with livestock grazing. Small

mammal population dynamics are variable. The causes of this variability are not well understood (Krebs and Myers 1974).

Douglass and Frisina's (1993) study compared small mammal abundance within a three-pasture rest rotation grazing system with an ungrazed control. The results of their study are applicable for predicting the effects on small mammals in this analysis, since their study incorporated the scenarios for livestock grazing that are reflected in Alternatives A, B, and C. One exception is that the rested allotment in their study was only rested for one year. Alterative B proposes rest that may occur for longer than one year. Therefore, the results for the rested pasture in this analysis would likely be greater than that of the study (including greater species abundance and diversity) because of the longer time for vegetation recovery. In general, their study indicates a reduction in overall species diversity and abundance with increased livestock grazing. Reduced cover may make some prey more vulnerable to predation. An increase in vegetation cover usually reflects an increase in small mammal populations and an increase in survival rate. Actual biomass available to prey is likely to be greater with reduced grazing.

Alternative A (No Action – Current Management)

Species diversity and overall species abundance across the allotment would likely be lowest among alternatives. Livestock grazing under Alternative A would continue to affect those species that require high levels of litter and residual vegetation, particularly in riparian areas and aspen stands.

Alternative B (Proposed Action)

Small mammal species diversity and overall species abundance across the allotment would likely be moderate among alternatives. Livestock grazing under this alternative would continue to affect those species that require high levels of litter and residual vegetation only within the un-rested portion of the allotment. The rested pasture, reduction in livestock numbers, and riparian fencing will enhance conditions for species that require greater vegetation cover. A variety of vegetation cover conditions would occur across the allotment. Vegetation treatments (prescribed fire in aspen stands and chemical spraying in sagebrush) will reduce habitat conditions for small mammals in the short term, but forage quality and quantity and cover will be greater in the long term after treatment.

Alternative C (No Grazing)

Small mammal species diversity and overall species abundance across the allotment would likely be highest among alternatives. Livestock grazing under this alternative would continue to affect those species that require high levels of litter and residual vegetation across the allotment for three years. After grazing is discontinued, vegetation conditions will improve and forage and cover will increase.

Alternative D (Two Pasture, Deferred Rotation)

This alternative would slightly improve forage and cover conditions for small mammals. Species diversity and overall species abundance across the allotment would improve slightly under Alternative D, of a magnitude between Alternative A and B.

The fenced riparian areas will enhance conditions for species that require greater vegetation cover. The pasture utilized early may show some recovery of vegetation forage and cover conditions once cattle are removed. The pasture grazed later would provide cover and forage benefits for the early portion of the summer for small mammals. Vegetation treatments (prescribed fire in aspen stands and chemical spraying in sagebrush) will reduce habitat conditions for small mammals in the short term, but forage quality and quantity and cover will be greater in the long term after treatment.

Gray Wolf

Because there has not been a breeding pair or a pack identified in Utah to date, only a dispersing animal, there are no direct or indirect effects to the gray wolf from the proposed action or any of the alternatives. If wolves from the federal recovery areas (Wyoming, Idaho, and Montana) were to enter Utah, they would receive protection under the Endangered Species Act. However, the gray wolf is not on the threatened or endangered species list for either Cache or Rich County. Prey species of the wolf are deer, elk, snowshoe hare, beaver and small mammals. Effects to these species are discussed under their respective sections.

4.8.4.2 Management Indicator Species

Northern goshawk

The northern goshawk is an Intermountain Region Sensitive Species (Section 4.8.4.5). Potential effects to it are described here, since it is also a WCNF Management Indicator Species.

The effects of livestock grazing on the goshawk are related to the effects on their prey habitat and populations. Grazing can affect goshawk by removing cover and food for prey species and when it interferes with aspen regeneration (Graham et al 1999). Grazing also affects habitat by altering the structure and species composition (grasses, forbs, and shrubs) of aspen stands, which changes goshawk foraging habitat (Graham et al 1999 and Reynolds et al 1992). Grazing can reduce or eliminate foraging habitat potential within riparian areas, which are sometimes selected for goshawk nesting sites (Hargis et al 1994, Patla 1994, and Reynolds et al 1992).

Reynolds et al (1992) recommend that livestock forage utilization should average 20 percent by weight and not exceed 40 percent in any area to maintain grass and forbs (40 percent average for shrubs) to provide food, such as berries, seeds, and leafy material, and cover for goshawk prey. He identified 14 important prey species and their special habitat attributes for maintaining sustainable goshawk prey populations. Of these, 12 occur within the North Rich Allotment, including American robin, blue grouse,

chipmunks, cottontails, golden mantled ground squirrel, and morning dove (with a need for a well developed herbaceous and shrub understory), northern flicker, red-naped sapsucker, red squirrel, and Williamson's sapsucker (which require a moderate understory), and Steller's jay and hairy woodpecker (whose requirements are low to none to maintain their populations).

Graham et al (1999) also analyzed habitat importance for additional goshawk prey species within Utah. These are the snowshoe hare, ruffed grouse, and mountain blue bird with a need for a well-developed herbaceous and shrub understory, the downy woodpecker that requires a moderate understory, and the three-toed woodpecker that requires no understory to maintain its populations.

The post-fledging area (PFA) for goshawk is an area in which considerable amount of foraging activity occurs due to it closeness to the nest and nest area. Capable acres for grazing (from Table 3.2) are approximately 100 acres, 39 acres, 59 acres, and 75 acres for the PFAs for territories A, B, C, and D (as listed in Table 3.22). Thus, the portion of each PFA potentially influenced by grazing is approximately 41%, 11%, 9%, and 13%, respectively. Portions of the area used by goshawk are conifer stands classified as not capable for livestock grazing.

As stated above, the effects of livestock grazing on the goshawk are related to the effects on their prey habitat and populations. The direct and indirect effects of implementing the proposed action or any of the alternatives are discussed below.

Alternative A (No Action – Current Management)

Although goshawk prey would most likely be in slightly lesser abundance under Alternative A as compared to other alternatives, gowhawk numbers will not likely change from the current condition. Small mammal species diversity and overall species abundance would likely be least among the alternatives. Snowshoe hare numbers will not likely change from the current condition. The hare population seems to be cyclic within the local area and swings in numbers will likely continue. Grouse numbers will not likely change from the current condition.

Alternative B (Proposed Action)

Under Alternative B, small mammal species diversity and overall species abundance across the allotment would likely be moderate among alternatives. Alternative B and Alternative C have approximately equal benefits to snowshoe hare. Alternative B creates early successional stands of young aspen that benefit snowshoe hare and rests a portion of the allotment, allowing for increased forage and cover. It is expected that ruffed grouse would benefit from the allotment improvements and thus a small increase in grouse numbers could occur. It is expected that blue grouse numbers would not change much from the current condition in the short term but in the long term may slightly increase. Increased prey abundance may increase nest success and nestling survivorship and may reflect in an increase in goshawk abundance.

Alternative B would create early successional habitat for goshawk and their prey through the prescribed burning of aspen. Currently, no known nests are located within any of the prescribed burn treatment units. Nor are any proposed vegetation treatment areas located within nest areas or post-fledging areas. If any nests are subsequently found within the treatment areas they will be documented and treatment will be suspended in that area, assuring protection of the nest area and the individual goshawks.

Alternative C (No Grazing)

Under Alternative C, small mammal species diversity and overall species abundance across the allotment would be greatest among alternatives. Increased prey abundance may increase nest success and nestling survivorship and may reflect in an increase in goshawk abundance. Alternative B and Alternative C have approximately equal benefits to snowshoe hares. Alternative C increases forage and cover across the allotment in the long term. An increase in cover would likely increase grouse nest success and increase survivorship of this goshawk prey species.

Alternative D (Two Pasture, Deferred Rotation)

Under Alternative D, small mammal species diversity and overall species abundance across the allotment would slightly improve to a magnitude between Alternatives A and B. Slightly increased prey abundance will likely increase nest success and nestling survivorship over the current condition. With the deferred rotation grazing system, the pasture grazed early may show some recovery of forage and cover conditions once cattle are moved. The deferred pasture would provide cover and forage for prey species early in the summer.

Like Alternative B, this alternative would create early successional habitat for goshawk and its prey (including snowshoe hare) through the prescribed burns in aspen. It is expected that ruffed grouse would benefit from the allotment improvements and thus a small increase in grouse numbers could occur. It is expected that blue grouse numbers would not change much from the current condition in the short term but in the long term may slightly increase.

Snowshoe Hare

Although apparently there have been no studies of dietary overlap between livestock and snowshoe hares, or response of snowshoe hares to cattle grazing, several such studies have been done for other rabbits and hares. Johnson (1979) found the dietary overlap of black-tailed jackrabbits to be 51% with cows and stated that competition could occur, depending on stocking rates. In southeastern Idaho, MacCracken and Hansen (1984) found that rabbits and hares compete directly with livestock for forage.

Grazing by livestock and wild ungulates may increase competition with snowshoe hare for forage resources, particularly in riparian areas. Browsing or grazing can have an

effect on snowshoe hare habitat by reducing the amount of available winter browse and altering the structure or composition of native plant communities.

Snowshoe hare densities and overwinter survival appear to be positively correlated with understory density (Adams 1959, Wolff 1980, Litvaitis et al. 1985). By changing native plant communities, such as aspen and high elevation riparian willow, grazing can degrade snowshoe hare habitat (Ruediger et al 2000).

As discussed in Section 3.9.2.2, snowshoe hare population numbers (as shown by pellet counts) can vary greatly within the local area. A number of factors (e.g., predation, vegetation condition) are likely responsible for this, although the primary cause is not known.

Alternative A (No Action – Current Management)

Snowshoe hare numbers will not likely change from the current condition. The hare population seems to be cyclic within the local area and these swings in numbers will likely continue. Livestock grazing under Alternative A would continue to reduce cover and forage vegetation for the snowshoe hare to some degree, although the implementation of the 30-40% utilization standard for rangeland in unsatisfactory condition will make some improvement to vegetation understory conditions.

Alternative B (Proposed Action)

Alternative B creates early successional stands of young aspen, rests a portion of the allotment each year, and reduces livestock numbers, resulting in increased forage and cover over existing conditions. An increase in cover would likely increase survivorship of snowshoe hare which could lead to slightly higher population numbers of across the allotment. Livestock grazing under Alternative B would continue to reduce cover and forage vegetation for the snowshoe hare to some degree within the non-rested portion of the allotment.

Prescribed fire within aspen stands will increase the available habitat for snowshoe hare after recovery from the burn. As young aspen stands start to regenerate an important food source becomes available to the snowshoe hare. They use this habitat until the stand has matured and no longer provides necessary cover or forage. Young, densely regenerating aspen stands with a well-developed understory provide quality habitat for snowshoe hares. However, during winter, the cover and food value of aspen stands for snowshoe hares decreases markedly in areas with deep snow pack.

Alternative C (No Grazing)

Livestock grazing under Alternative C would continue to reduce cover and forage vegetation for the snowshoe hare across the allotment for three years. When grazing is eliminated, vegetation conditions should recover and increases in forage and cover will become apparent across the allotment. The increase in cover would likely increase

survivorship which could lead to slightly higher population numbers of snowshoe hares across the allotment.

Alternative D (Two Pasture, Deferred Rotation)

Alternative D creates early successional stands of young aspen and defers a portion of the allotment to be grazed by livestock later in the summer, thus allowing for a slight increase in forage and cover benefitting snowshoe hare. The pasture grazed early may show some recovery of forage and cover conditions once cattle are moved.
The deferred pasture would provide cover and forage for snowshoe hare early in the summer, before it is grazed. An increase in cover and forage may increase survivorship which could lead to slightly higher population numbers of snowshoe hare across the allotment (to a magnitude between Alternatives A and B).

Beaver

The distribution of beaver on the North Rich Allotment relates to the presence of perennial water. Substantial changes in the beaver population are not likely here, due to the limited availability of perennial water within the allotment area. However, the distribution of beaver in this area has been influenced by trapping (especially in close proximity to open roads) and by the removal of problem beaver within specific drainages by Utah Division of Wildlife Resources.

Alternative A (No Action – Current Management)

Although Alternative A would not improve riparian conditions, beaver numbers will not likely change from the current condition. The lack of perennial water in the allotment is the primary factor limiting the beaver population. Livestock grazing would continue to reduce the amount of willows available as forage and for use as building materials where currently available on the allotment. Cattle use woody material particularly during late summer when other quality forage is less available.

Alternative B (Proposed Action)

Under Alternative B, riparian exclosures will protect some of the riparian areas used by beaver from livestock grazing and trampling. Therefore, this alternative would improve some riparian conditions and may lead to a small increase in beaver numbers. The increase, if any, would be small however, due the limited availability of perennial water within the allotment.

Livestock grazing would continue to reduce the amount of willows available as forage and for use as building materials within non-rested pastures and non-protected riparian areas in the allotment. Vegetation treatments in aspen, tarweed, and sagebrush will not have any effect on beavers or their habitat. Concentrating livestock into two pastures within the allotment and a reduction in numbers of livestock may allow for herders to

improve the distribution of cattle within the area and thus reducing impacts to riparian, wet meadows, springs, and adjacent vegetation.

Alternative C (No Grazing)

This alternative would improve riparian conditions within the allotment after grazing is discontinued and would likely benefit the beaver the greatest among alternatives. However, large changes in the beaver population are not likely due the limited availability of perennial water within the allotment area.

Alternative D (Two Pasture, Deferred Rotation)

Like under Alternative B, riparian exclosures under this alternative will protect some of the riparian areas used by beaver from livestock grazing and trampling. Therefore, like Alternative B, this alternative would improve some riparian conditions and may lead to a small increase in beaver numbers. The increase, if any, would be small however, due the limited availability of perennial water within the allotment.

Grazing effects on willows may be reduced within the pasture used in the early summer under this alternative, since cattle are more likely to use browse species during late summer.

4.8.4.3 Federally Listed Threatened, Endangered, Proposed, and Candidate Species

Habitat for bald eagles, black-footed ferrets, and yellow-billed cuckoos is not provided for in the North Rich Allotment and there have been no recorded occurrences of these species. Therefore, populations of these species will not be affected by any of the alternatives. See Section 3.9.3.1 for a description of their habitats. The area that contains the North Rich Allotment is considered linkage habitat for the Canada lynx, listed as threatened. The potential effects to linkage habitat and potential prey species are discussed below.

Canada lynx

On July 3, 2003, the U.S. Fish and Wildlife Service issued a Notice of Remanded Determination of Status for the contiguous United States distinct population segment of the Canada Lynx (USDI 2003). The notice states that there is no evidence of lynx reproduction in Utah and that lynx, which occur in Utah, are dispersers rather than residents.

As discussed in Section 3.9, reports of lynx in Utah indicate sightings between 1961 and 1982 on the Ashley and Wasatch-Cache National Forests, but no sightings between 1983 and 1993 (USDA Forest Service 1994). In 1999-2001, lynx hair snares were established throughout Utah and other western states. Results indicated no lynx hair samples were snared in northern Utah during this effort. One of the Utah hair snare grids is located within the North Rich Allotment.

The North Rich Allotment lies within what is thought of as a potential travel corridor for the Canada lynx rather than a permanent resident habitat. As stated in Section 3.9, the area within the North Rich Allotment was reclassified in 2002 from a Lynx Analysis Unit (LAU) to Linkage Area, due to a low percentage of primary lynx habitat found here.

The Lynx Conservation Strategy (Ruediger et al 2000) specifies the following programmatic planning guideline in Linkage Areas: "Where feasible, maintain or enhance native plant communities and patterns and habitat for potential lynx prey, within identified key linkage areas."

The July 3, 2003 U.S. Fish and Wildlife Service Notice of Remanded Determination of Status for the contiguous United States distinct population segment of the Canada Lynx (USDI 2003) specified that no evidence exists that certain risk factors pose a threat to individual lynx, lynx populations, or lynx habitat. Grazing was not specifically addressed because there was no information to indicate that it posed a threat to lynx.

In relationship to effects to the wildlife corridor and that of prescribed burning, the following is pertinent from the Notice: " To significantly impact a local lynx population, an activity would have to occur across a very large area (presumably at least the size of several home ranges), create a homogeneous forest that does not provide the various stand ages, species composition, and structure that are good snowshoe hare and lynx habitat, or result in a barrier that effectively precludes dispersal."

Although the lynx is not a permanent resident here, the potential effects to the lynx are related to the effects on their preferred prey, primarily snowshoe hare, but also grouse and a variety of small mammals. The effects to lynx prey species are discussed below.

Alternative A (No Action – Current Management)

Prey would most likely be in lesser abundance under Alternative A as compared to other alternatives because grazing is continued, no area is rested, and no vegetation treatments are conducted. Snowshoe hare numbers will not likely change from the current condition. The hare population seems to be cyclic within the local area and these swings in numbers will likely continue. Small mammal species diversity and overall species abundance across the allotment would likely be least among alternatives under Alternative A.

Alternative B (Proposed Action)

Alternative B creates early successional stands of young aspen that benefit snowshoe hare and rests a portion of the allotment, allowing for increased forage and cover for lynx prey species. Small mammal species diversity and overall species abundance across the allotment would likely be greater than Alternative A, but less than Alternative C.

Alternative C (No Grazing)

Prey would most likely be in greatest abundance under Alternative C as compared to

other alternatives. As related to snowshoe hare, Alternatives B and C have approximately equal benefits to lynx but in different ways. Alternative C increases forage and cover across the allotment after grazing is eliminated. But it does not create early successional stands of young aspen as under Alternative B. Under Alternative C, small mammal species diversity and overall species abundance across the allotment would likely be greatest among alternatives.

Alternative D (Two Pasture, Deferred Rotation)

Alternative D creates early successional stands of young aspen that benefit snowshoe hare, thus slightly increasing forage and cover for lynx prey species. Small mammal species diversity and overall species abundance across the allotment would likely be greater than Alternative A, but less than Alternatives B and C.

4.8.4.4 Forest Service Intermountain Region Sensitive Species

For the comparison of effects on sensitive wildlife species and their habitat, each alternative is compared to the current condition that includes livestock grazing. The estimates of effects also account for other activities within the alternatives, such as vegetation treatments, improvements, and cumulative effects, including past, present, and reasonably foreseeable future actions.

Northern goshawk
Northern goshawks are also Management Indicator Species for the Forest and are described in detail in Section 4.8.4.3.

Peregrine falcon
Suitable habitat for peregrine falcon is not provided for in the North Rich Allotment and there have been no recorded occurrences. Therefore, populations of this species will not be affected by any of the alternatives.

Boreal owl
The effects to the boreal owl are related to the effects on their prey, primarily voles. A majority of the area used by the boreal owl is large stands of conifer. Most of these areas are not capable acres (see Table 3.2) and thus are not used by livestock. The effects of any of the alternatives would be negligible on boreal owl habitat or populations.

Great gray owls
Great gray owls use mixed coniferous and hardwood forests usually bordering small openings or meadows. They forage along edges of clearings. Semi-open areas, where small rodents are abundant, near dense coniferous forests, are optimum habitat for great gray owls. In the Intermountain Region, great gray owls occur primarily in lodgepole pine, Douglas-fir, aspen and ponderosa pine. There have been sightings of great gray owls on the Wasatch-Cache National Forest and on the Ashley National Forest, although,

generally, it is felt these winter vagrants only occasionally visit Utah. The effects of any of the alternatives would be negligible on great gray owl habitat or populations.

Greater sage grouse

Sage grouse were added to the Intermountain Region Sensitive Species list on November 17, 2003. Recent research has documented population declines of this species and identified concerns over the amount and quality of its habitats (letter on file in the project record). Sage grouse prefer tall, dense sagebrush-dominated ecosystems, associated with deep soils. This habitat does not occur within the project area. It occurs at lower elevations to the east. Surveys for the sage grouse have been conducted by UDWR for several years, primarily centered on locating leks and conducting population counts at lek sites. The UDWR Habitat Maps display the nearest sage grouse habitat (including leks, winter habitat, and yearlong habitat) in lower elevations east of the project area (see project file). Suitable habitat for sage grouse is not provided for in the North Rich Allotment and there have been no recorded occurrences. Therefore, populations of this species will not be affected by any of the alternatives.

Pygmy rabbits

As discussed in Section 3.9.2.4, the presence of the pygmy rabbit within the allotment is not expected. The effect on pygmy rabbits from livestock grazing was reviewed in the Washington State Recovery Plan for the Pygmy Rabbit (Washington Department of Fish and Wildlife 1995). In their report, one study that compared densities of burrow sites and systems found no difference between grazed and ungrazed sites. However, they reported that when cattle numbers are high, sagebrush habitat can be rendered unsuitable for pygmy rabbits if breakage results in open sagebrush canopy conditions.

Spring and/or summer surveys for pygmy rabbits will be conducted in sagebrush areas to be treated under Alternatives B or D, to assure that pygmy rabbits do not occur within the areas. In the unlikely event pygmy rabbits are found within any of the proposed sagebrush treatment areas, sagebrush treatment locations will be reassessed in light of the new-found information and a new decision regarding these specific treatment areas will be made.

Wolverine

The effects to the wolverine are related to the effects on their prey, including small to medium sized mammals such as rabbits and hares, beavers, squirrels and a variety of ground nesting birds. In winter, dead animals, primarily deer, elk, and moose, are an important food source for the wolverine.

Alternative A (No Action – Current Management)

Under Alternative A, small mammal species diversity and overall species abundance across the allotment would likely be lowest among alternatives. Population numbers of two prey species, beaver and snowshoe hare, will not likely change from the current condition. Because of continued grazing, no rested areas, no riparian fencing, and no vegetation treatments, prey would most likely be in lesser abundance under Alternative A

as compared to other alternatives.

Alternative B (Proposed Action)

Under Alternative B, small mammal species diversity and overall species abundance across the allotment would likely be moderate among alternatives. This alternative creates early successional stands of young aspen that benefit snowshoe hare and rests a portion of the allotment allowing for increased forage and cover. This alternative would likely increase beaver numbers, though this would be small due the limited availability of perennial water within the allotment area.

Alternative C (No Grazing)

Relative to wolverine prey species, small mammal species diversity and overall species abundance across the allotment would likely be highest under Alternative C. As related in particular to the snowshoe hare and beaver, Alternative B and Alternative C have approximately equal benefits. Alternative C increases forage and cover across the allotment, but does not create early successional stands of young aspen. This alterative would likely increase beaver numbers, although the increase would be small due to the limited availability of perennial water in the allotment area.

Alternative D (Two Pasture, Deferred Rotation)

Under Alternative D, small mammal species diversity and overall species abundance across the allotment would improve slightly among alternatives, in magnitude between Alternatives A and B. Alternative D creates early successional stands of young aspen that benefit snowshoe hare and defers a portion of the allotment to be grazed later in the summer by livestock, providing forage and cover early in the summer. This alternative would result in a slight increase in beaver, although the change would be small due to limited availability of perennial water within the allotment.

Townsend's big-eared bat
None of the alternatives would affect bat roosting sites, maternity colonies, or hibernacula. Effects to foraging habitat for bat species, mainly in riparian areas, would vary to some degree between alternatives. These effects would not likely influence bat numbers since populations are more affected by availability of roost sites and other factors than condition of foraging habitat.

Alternative A (No Action – Current Management)

Livestock grazing would continue to affect foraging habitat for bat species, mainly in riparian areas, wetlands, and springs where vegetation has been reduced by livestock grazing and trampling. This reduction in vegetation likely affects the abundance of nocturnal insect species that bats forage on, although this does not likely influence actual bat numbers. Bat populations are more influenced by the availability of suitable roost sites and other such limiting factors.

Alternative B (Proposed Action)

Effects on foraging habitat for bat species would be to a lesser degree under this alternative than Alternatives A and D. The combination of a rest-rotation pasture system, reduction of livestock numbers, the implementation of utilization standards on unsatisfactory rangeland, and riparian exclosures will improve vegetation conditions. This situation would improve habitat for insects associated with these areas, though this may not influence actual bat numbers. Prescribed burning and sagebrush treatments could reduce or change the use of foraging areas by the big-eared bats in the short-term. However, overall use of treated areas may actually increase in the long term since bats are more abundant in areas with a higher amount of deciduous vegetation.

Alternative C (No Grazing)

After grazing is discontinued, vegetation conditions would be restored to riparian areas. This situation would improve habitat for insects associated with these areas. However, this may have a negligible influence on actual bat numbers since bat populations tend to be more influenced by the availability of suitable roost sites or other such limiting factors.

Alternative D (Two Pasture, Deferred Rotation)

Livestock grazing would affect foraging habitat for bat species, mainly in riparian areas, wetlands, and springs, to an intermediate degree between Alternatives A and B.

Flammulated owl

The flammulated owl feeds almost exclusively on insects, primarily moths. Habitats vary in the capability to support prey and it is unknown whether this influences owl distribution (Hayward and Verner 1994). To address effects, an assumption has been made that greater foliage volume supports more insects.

Alternative A (No Action – Current Management)

Although habitat conditions may be affected to some degree by continued grazing, flammulated owl numbers will not likely change from the current condition. Livestock grazing would continue to affect foraging habitat for flammulated owls, mainly in aspen areas. Vegetation cover is reduced from a combination of livestock grazing and trampling which likely decreases the abundance of nocturnal insect species that are foraged upon. This alternative would not affect owl nesting sites.

Alternative B (Proposed Action)

Like under Alternative A, under Alternative B livestock grazing would continue to affect foraging habitat for flammulated owls, mainly in aspen areas. The combination of a rest-rotation pasture system, the implementation of utilization standards on unsatisfactory rangeland, reduced permitted livestock numbers, and the installation of riparian exclosures would improve habitat for insects associated with portions of the allotment. This would likely increase nest success and nestling survivorship and may reflect in an increase in flammulated owl abundance.

Prescribed burning in aspen stands would affect areas used by the flammulated owl in the short-term. But, treatments will improve vegetation conditions in the treated aspen stands in the long term, thus overall enhancing habitat conditions and having beneficial effects for flammulated owls in the long term. The prescribed burns in aspen stands could affect nesting sites, though prescribed fire would not occur during nesting activities. Also, the prescribed fire will likely create new snags for nest cavities for the flammulated owl.

Alternative C (No Grazing)

For three years, livestock grazing would continue to affect foraging habitat for flammulated owls, mainly in aspen areas. After grazing is discontinued vegetation conditions would recover, improving habitat for insects across the allotment and likely increasing nest success and nestling survivorship. This may reflect an increase in flammulated owl abundance.

Alternative D (Two Pasture, Deferred Rotation)

Like under Alternatives A and B, livestock grazing would continue to affect foraging habitat for flammulated owls, mainly in aspen areas. The combination of a deferred-rotation pasture system, the implementation of utilization standards on unsatisfactory rangeland, and the installation of riparian exclosures would slightly improve habitat for insects associated with portions of the allotment. This may slightly increase nest success and nestling survivorship and may reflect in a small increase in flammulated owl abundance. Effects of prescribed fire treatments in aspen stands would be the same as Alternative B.

Three-toed woodpecker

Alternative A (No Action – Current Management)

Livestock grazing under this alternative would have no effect on the three-toed woodpecker. This species nests, roosts, and forages in conifer and conifer/aspen forests and is not dependent on understory vegetation conditions.

Alternative B (Proposed Action)

Implementation of the prescribed burning proposed in this alternative is likely to have a slight positive effect on three-toed woodpeckers, due to the small size of the proposed treatments. Three-toed woodpeckers have increased in other areas after forest fires. The

burns are likely to create a mosaic stand structure, thus providing some snags and standing live trees for nest cavities.

Alternative C (No Grazing)

This alternative would have no effect on the three-toed woodpecker. This species nests, roosts, and forages in conifer and conifer/aspen forests and is not dependent on understory vegetation conditions.

Alternative D (Two Pasture, Deferred Rotation)

Effects would be the same as Alternative B, as described above.

4.8.4.5 Neotropical Migratory Birds

Executive Order (EO) 13186, signed January 10, 2001, lists several responsibilities of federal agencies to protect migratory birds, including "Support the conservation intent of the migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory bird resources when conducting agency actions."

Additional direction comes from the Memorandum of Understanding (MOU) between USDA Forest Service and USDI Fish and Wildlife Service, signed January 17, 2001. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the Forest Service and Fish and Wildlife Service, in coordination with state, tribal and local governments. The MOU identifies specific activities for bird conservation, pursuant to EO 13186, including "Strive to protect, restore, enhance, and manage habitat of migratory birds, and prevent the further loss or degradation of remaining habitats on National Forest System lands." This includes, identifying management practices that impact populations of high priority migratory bird species, including nesting, migration, or over-wintering habitats, on National Forest System lands, and developing management objectives or recommendations that avoid or minimize these impacts.

As displayed in Appendix E, numerous Neo-tropical migratory birds occur within the project area. In general, species that benefit from a greater abundance of understory vegetation for cover will increase with a reduction or elimination of livestock grazing. Those species that prefer more open conditions and less understory vegetation will decline with a reduction or elimination of livestock grazing. Alternative B, which includes both rested pastures and livestock grazing, would provide habitat conditions for a range of Neo-tropical bird species that possess a variety of habitat requirements and preferences. The Brewer's sparrow and broad-tailed hummingbird are discussed below because of their priority status under the Partners in Flight (PIF) ranking and because they are found within the allotment. See Appendices E and F.

Brewer's Sparrow

Alternative A (No Action – Current Management)

Under Alternative A, livestock grazing at the current level would maintain old and dense mountain big sagebrush areas and lower herbaceous understory cover. This is habitat preferred and utilized by Brewer's sparrows for breeding. However, the dense mountain big sagebrush areas of uniform age are susceptible to catastrophic wildfires. A catastrophic fire would greatly reduce the amount of habitat available for breeding Brewer's sparrows.

Alternative B (Proposed Action)

Parrish et al (2002) promoted the use of prescribed burning and revegetation to avoid catastrophic wildfires and recommended using small-scale chemical control methods to enhance Brewer's sparrow habitats. This alternative would treat sagebrush areas in the northern portion of the allotment within areas of Brewer's sparrow habitat. Age class and structural diversity would be created within mountain big sagebrush areas. This would reduce habitat and possibly the population in the short term, but would benefit the Brewer's sparrow in the long term by maintaining a more stable population and reduce the risk of a catastrophic fire that could greatly reduce Brewer's sparrow habitat. The mitigation below would be used to minimize effects to Brewer's sparrows and provide breeding habitat.

Alternative C (No Grazing)

Susceptibility to catastrophic wildfires in the dense mountain big sagebrush areas would increase since fine fuels, such as grasses, will be more abundant. A catastrophic fire would greatly reduce the amount of habitat available for breeding Brewer's sparrows and reduce Brewer's sparrow numbers.

Alternative D (Two Pasture, Deferred Rotation)

Effects would be the same as Alternative B, as described above.

Broad-tailed Hummingbird

Alternative A (No Action – Current Management)

Broad-tailed hummingbird numbers will not likely change from the current condition. However, livestock grazing would continue to affect foraging habitat for the broad-tailed hummingbird, mainly in riparian areas and adjacent uplands. These uplands are primarily tall forb and aspen communities containing species that the hummingbird uses such as tall larkspur and Indian paintbrush. These species have been reduced in many areas from a combination of livestock grazing and trampling. Conditions would slightly improve under this alternative with the implementation of the 30 to 40% utilization standard on

unsatisfactory rangeland. This alternative would not likely affect nests (3-30 feet in height), but could affect vegetation conditions associated with lower canopy nest sites.

Alternative B (Proposed Action)

Understory vegetation diversity, especially within aspen stands, would slowly increase under this alternative and native forb species used by the broad-tailed hummingbird would be more abundant, due to pasture rest and the reduction of livestock numbers. This may result in an increase in broad-tailed hummingbird abundance. Livestock grazing would continue to affect foraging habitat for the broad-tailed hummingbird, mainly in riparian areas and adjacent uplands, but to a lesser degree under this alternative. Riparian exclosures will protect riparian areas that contain native forbs used by the broad-tailed humming bird. Prescribed burning and sagebrush treatments would reduce or change the use of foraging areas and abundance of native forbs in the short-term. However, the overall use of treated areas would likely increase since burning and treatment would increase species diversity in the long term. Like Alternative A, this alternative would not likely affect nests (3-30 feet in height) but could affect vegetation conditions associated with lower canopy nest sites.

Alternative C (No Grazing)

Understory vegetation diversity, especially within aspen stands, would slowly increase, thus native forb species utilized by the broad-tailed hummingbird will be more abundant. This may result in an increase in broad-tailed hummingbird abundance. Livestock grazing would affect foraging habitat for the broad-tailed hummingbird for three years, mainly in riparian areas and adjacent uplands. Grazing would then be discontinued, allowing for the recovery of vegetation conditions. This alternative would not affect nests (3-30 feet in height) or nesting habitat.

Alternative D (Two Pasture, Deferred Rotation)

Understory flowering species used by the broad-tailed hummingbird would be slightly more abundant under this alternative, due to a portion of the allotment being deferred from grazing until late summer. This may result in a slight increase in broad-tailed hummingbird abundance. Riparian exclosures and treatments in aspen and sagebrush would have results the same as Alternative B. Like Alternative A, this alternative would not likely affect nests (3-30 feet in height) but could affect vegetation conditions associated with lower canopy nest sites.

4.8.5 Mitigation

The following mitigation measures should be implemented in addition to the management requirements listed in Section 2.5. These measures have been developed from available literature on habitat characteristics preferred by breeding and nesting Brewer's sparrows (see Parrish et al 2002).

- Vegetation treatments should occur prior to May 1st or in late summer or fall to avoid impacting nests, eggs, and nestlings.

- Patches of mountain big sagebrush larger than 1.2 acres in size (average territory size), distributed within the treatment areas should be retained to provide Brewer's sparrow habitat. Areas should be selected to have tall and dense sagebrush and have large amounts of bare ground or less herbaceous understory vegetation than surrounding habitat. The areas should also have a high percentage of live shrub growth and little rock covered ground. The average height of sagebrush of nest areas in Idaho was approximate 27 inches tall.

4.8.6 Unavoidable Adverse Effects

With the implementation of management requirements and mitigation, no unavoidable adverse effects are expected.

4.8.7 Short-term Uses vs. Long-term Productivity

As described above, there may be some short term loss of habitat during recovery from prescribed burning in aspen and treatment of sagebrush communities. However, these would ultimately improve habitat and species diversity in the long term.

4.8.8 Irreversible and Irretrievable Commitments

Should the proposed action be implemented, there will be no irreversible or irretrievable commitments of wildlife resources, as described under the alternatives.

4.8.9 Cumulative Effects

Area of influence

The area of influence for the cumulative effects analysis for wildlife is the area within and adjacent to the North Rich allotment. The allotment is located within a portion of a wildlife corridor which has regional importance in providing linkage to other larger habitat areas. This is especially true for forest carnivors such as the Canada lynx (see Section 3.9.2.3 Threatened, Endangered, Proposed, and Candidate Species). Maintaining vegetation age class diversity within the corridor is important to provide for the needs of a variety of species. For game species such as deer and elk, the area under consideration is the Cache Harvest Unit.

Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action

The interdisciplinary team identified past, present, and future ground disturbing activities which, when combined with the proposed action or alternatives, could cumulatively affect wildlife and habitat within the analysis area (see Appendix J). The major influences on wildlife and their habitats within and adjacent to the North Rich Allotment have been livestock grazing (which has had some affect on cover, forage, and vegetation composition and species diversity), fire suppression (which has reduced the presence of early successional vegetation classes) and roads, trails, and winter recreation use (which has affected wildlife through disturbances or changes in wildlife species competition for prey). Because of the limited extent of occurrence, fire and timber harvest have had minor affects to wildlife in the allotment and adjacent area.

Grazing

Historic records indicate that the number of sheep and cattle grazing this area in common 100 years ago were many times the number today. Historic livestock grazing at high levels has influenced wildlife habitat factors such as vegetation cover, forage, and species composition. A combination of livestock and big game grazing has influenced aspen regeneration and reduced the occurrence of fire in forested stands within the allotment in the past. Historic livestock grazing has changed the understory species composition within many aspen stands, leaving many unpalatable species. Past livestock grazing has created grazing-altered conditions such as the reduction of tall forb communities. Livestock grazing has reduced hiding and nesting cover for wildlife species that depend on cover for security. In general, livestock grazing has decreased vegetation structural diversity in portions of the allotment, particularly in riparian and aspen areas. A decrease in vegetation structure, species composition, and vegetation cover potentially decreases wildlife diversity and abundance.

Travel Management

Motorized vehicles (summer and winter) cause disturbances to wildlife species. This is likely to increase as popularity and use of ATVs and snowmobiles increase. Big game and other wildlife usually will avoid or reduce the use of areas within approximately ¼ mile of travel ways. Road and trail access and recreational use that results in snow compaction may allow ingress of coyotes into lynx habitat (linkage areas) resulting in increased competition for prey (Buskirk et al. 2000). This is also likely for other forest carnivores such as the wolverine.

In the July 3, 2003, U.S. Fish and Wildlife Service Notice of Remanded Determination of Status for the contiguous United States distinct population segment of the Canada Lynx (USDI 2003) it states that there is no evidence of lynx being displaced by or avoiding forest roads. Also, there is no evidence of competition from other predators or competition caused by packed snow trails.

Fire

Fire has had minor affect on wildlife in the allotment area. Fire suppression has likely had the greatest affect by reducing the abundance of species that prefer early successional vegetation classes. Fire suppression has reduced habitat for wildlife species that utilize aspen. Prescribed fire and natural fire would benefit some wildlife species within the area by creating early successional stages and maintaining diversity in stand age and structure.

Timber Harvest

Overall, timber harvest has had a minor affect to wildlife in the allotment area. The majority of the forest type is old or mature. Past conifer timber harvest most likely benefited species (those which prefer early successional stands) by the creation of openings and young conifer and aspen stands. This is especially true for species such as the snowshoe hare, which prefers young lodgepole pine stands.

Riparian Fencing

Three riparian fencing projects are planned or have been completed within the North Rich Allotment under a Decision Memo signed by District Ranger Rob Cruz on March 4, 2003. The Tin Cup Spring riparian fence was completed in fall 2003. It was designed to protect Tin Cup Spring and the boreal toad population there. The second project is planned for Jebo Springs. This project should improve conditions at the spring and provide improved wildlife habitat. Another project is underway at Mill Hollow Springs. This project should improve water quality and riparian conditions in Mill Hollow and Saddle Creek.

Summary

Expected cumulative effects to wildlife habitats and wildlife species with implementation of Alternative A will result in maintaining current conditions on the allotment, with minor improvement based on the 30 to 40 % utilization standard. There would be an expected improvement in wildlife habitat conditions with implementation of Alternative B, based on riparian fencing, vegetation treatments, reduced numbers, and the rest rotation grazing system. Implementation of Alternative C would result in the most widespread improvement of wildlife habitat. Implementation of Alternative D would improve conditions within fenced riparian areas and would result in a small improvement from current conditions in areas outside of riparian exclosures.

Chapter 5
The List of Preparers

The following are the members of the interdisciplinary team for the North Rich Analysis.

Contributor	Education/Experience	Contribution
Steve Blatt Wildlife Biologist, Logan & Ogden Ranger Districts	B.S. Wildlife Management, 15 years experience in wildlife management.	Wildlife Resources
Paul Chase Fisheries Biologist, Logan & Ogden Ranger Districts	B.S., M.S. Fisheries and Wildlife Management, 4 years experience as a fisheries biologist.	Aquatic Resources
Charlie Condrat Hydrologist, W-C NF Supervisor's Office	B.S. Forestry, M.S. Watershed Science, 12 years experience with the Forest Service.	Hydrology and Watershed
Jennifer Eberlien Heritage Program Manager W-C NF Supervisor's Office	B.A., M.A. Anthropology, 10 years experience with the Forest Service as an archeologist.	Heritage Resources, Social-Economics
Paul Flood Soil Scientist, W-C NF Supervisor's Office	B.S. Soil Science, 23 years experience with the Forest Service.	Soil and Watershed
Chris L Lauver Rangeland Management Specialist, Logan & Ogden Ranger Districts	Ph. D in Range Science, 16 years experience in natural resource management and conservation.	Range Management and Vegetation
Wayne Padgett Ecologist, W-C NF Supervisor's Office	B.S. Biology, M.S. Rangeland Ecology, 2 years staff research associate in soils, 2 years private consulting in ecology, and 19 years experience with the Forest Service.	Vegetation, Rare Plants, and Range Management
Tom Scott Social Scientist, W-C NF Supervisor's Office	B.A. American History, M.A. Anthropology, 25 years experience with the Forest Service.	Social-Economics
Evelyn Sibbernsen Forester, Logan Ranger District	B.S. Resource Conservation, M.S. Forest Management, 22 years experience with the Forest Service.	NEPA Coordinator
Ronald Vance Recreation Resource Manager, Logan Ranger District	B.A. Psychology, M.A. Landscape Architecture, 8 years experience with the Forest Service.	Recreation

CHAPTER 6
Consultation and Coordination

List of agencies, Organizations and Persons to Whom Copies of the Statement Were Sent

Federal Agencies

U.S. Department of Agriculture
- National Agricultural Library
- National Park Service
- Natural Resource Conservation Service
- USDA Animal and Plant Health Inspection Service
- U.S. Forest Service
- U.S. Army Corps of Engineers

U.S. Department of Interior
- Office of Environmental Project Review
- U.S. Fish and Wildlife Service
- Bureau of Land Management

Environmental Protection Agency
- Washington Office
- Denver Office – Region VIII

American Indians
- Shoshone-Bannock Tribe
- Northwestern Band of Shoshone

State Government

State of Utah
- Governors Office of Planning and Budget
- Resource Development Coordinating Committee
- Department of Natural Resources

Utah Congressional Delegation
- Congressman Rob Bishop
- Senator Orrin Hatch
- Senator Robert Bennett

Universities
- Utah State University

County Governments

Utah

Cache County Commission
Rich County Commission

Others

Over 50 interested or affected individuals, businesses, and organizations received the Draft Environmental Impact Statement for the North Rich Allotment

Chapter 7
Literature Cited

Adams, L. 1959. An analysis of a population of snowshoe hares in northwestern Montana. Ecological Monographs 29: 141-170.

Anderson, J.E. and K.E. Holte. 1981. Vegetation development over 25 years without grazing on sagebrush-dominated rangeland in southeatern Idaho. Journal of Range Management. 34(1):25-29.

Armour, C., D. Duff, and W. Elmore. 1994. The effects of livestock grazing on western riparian and stream ecosystems. Fisheries 19(9):9-12.

Arrington, L. J. and L. Wilcox. 1989. From Subsistence to Golden Age: Cache Valley Agriculture, 1859-1900. Utah Historical Quarterly, Fall 1989/Vol. 57/No. 4. p. 368.

Bartos, D.L., J.K. Brown, and G. D. Booth. 1994. Twelve years biomass response in aspen communities following fire. Journal of Range Management. 47: 79-83.

Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6.

Belnap, J.; Kaltenecker, J.H.; Rosentreter, R.; Williams, J.; Leonard, S.; Eldridge, D. 2001. Biological Soil Crusts: Ecology and Management. US Dept. Iinterior Technical Report 1730-2. 110 p.

Belsky, A. J., A. Matzke, and S. Uselman. 1999. Survey of livestock influences on stream and riparian ecosystems in the western United States. Journal of Water Conservation 54: 419-431.

Bentz, B.J. and A.S. Munson. 2000. Spruce beetle population suppression in northern Utah. Western Journal of Applied Forestry 15: 122-128.

Bissonette, J. A., L. J. Christiansen, and N. H. Smith. 1995. Final Report Franklin Basin (UT, ID) Wolverine Survey. Conducted for U. S. Forest Service, Caribou National Forest and Uinta and Wasatch-Cache National Forests, Idaho Department of Fish and Game and Utah Division of Wildlife Resources.

Bohling, N., J. Brow, D. Dinkel, D. Fresque, M. Macey, E. Mohr, V. Parent, K. Parkinson, and R. Rasmussen. 1999. The Cache-Rich Summit Landscape Assessment, Utah State University, College of Natural Resources, Logan,

Bohn, C.C. and J.C. Buckhouse. 1985. Some responses of riparian soils to grazing management in northeastern Oregon. Journal of Range Management 38(4): 378- 381.

Bradley, A.F., N.V. Noste, and W.C. Fischer. 1992. Fire Ecology of Forests and Woodlands in Utah. General Technical Report INT-287, Intermountain Research Station.

Braun, C.E., M.F. Baker, R.L. Eng, J.S. Gashwiler, and M.H. Schroeder. 1976. Conservation committee report on effects of alternation of sagebrush communities on the associated avifauna. Wilson Bulletin 88: 165-171.

Bridgerland Audubon Society. 1994. Checklist of birds of Cache Valley. Logan, Utah.

Brown, J. 1981. 1981 Small Mammal Survey - Big Creek.

Buskirk, S.W., L.F. Ruggiero, K.B. Aubry, D.E. Pearson, J.R. Squires, and K.S. McKelvey. 2000. Comparative ecology of lynx in North America. Chapter 14 *In* Ruggiero, L.F., K. B. Aubry, S. W.Buskirk, et al., tech. eds. Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 p.

Campbell, J.B. 1970. Hibernacula of a population of *Bufo boreas boreas* in the Colorado Front Range. Herpetologica 25: 278-282.

Campbell, R. 2001. Personal Communications. Forest Ecologist, Fishlake National Forest.

Chaney, E., W. Elmore, and W.S. Platts. 1990. Livestock grazing on western riparian areas. U. S. Environmental Protection Agency, Washington D.C.

Chapman, K., E.B. Godfrey, and D.B. Neilsen. 1997. The Impact of Public Land Use on the Economy of Rich County, Utah. A report submitted to the Rich County Commission. Manuscript on file at the Supervisor's Office, Wasatch-Cache National Forest, Salt Lake City, Utah.

Cherry, Steve 1981. 1981 Small Mammal Survey-Big Creek. Letter to Jack Brown, BRRA Wildlife Management Biologist. Department of the Interior, Bureau of Land Management. 3 pp.

Clark, R.M. 1976a. Cultural Resource Survey for Log Cabin Timber Sale (WS-76-15). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Clark, R.M. 1976b. Cultural Resource Survey of Sinks Area Snowmobile Parking Lot (WS-76-31). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Clark, R.M. 1976c. Cultural Resource Survey of the Tufts Creek Timber Sale (WS-76-32). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Clark, R.M. 1976d. Cultural Resource Survey of the Relocation of Sinks Road No. 20055 (WS-76-29). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Clark, W. 1973. Reproduction, survival, and density of snowshoe hares in northeastern Utah. Unpublished MS Thesis. Utah State University, Logan.

Cowley, P. 1996. Fish surveys on the Uinta and Wasatch-Cache National Forest conducted during 1996. Wasatch-Cache National Forest. Salt Lake City, Utah.

DeByle, N.V. 1985. Animal Impacts. Pages 115-123 *in* N. V. DeByle and R. P. Winokur, eds. Aspen: ecology and management in the western United States. USDA For. Serv. Gen. Tech. Rept. RM-GTR-119. Rocky Mountain Station, Fort Collins, Colorado.

Douglas, R.J. and M.R. Frisina. 1993. Mice and management on the Mount Haggin wildlife management area. Rangelands Vol. 15(1).

Dover, J.H. 1995. Geologic Map of the 30'x60' Quadrangle, Cache and Rich Counties, Utah. U.S. Geological Survey, Miscellaneous Investigation Series I-2210.

Drlik, T., I. Woo, and S. Swiadon, Editors. 1998. Integrated vegetation management guide. Bio-Integral Resource Center, Berkeley, CA. 16pp

Eberlien, J. 2002a. North Rich Allotment Management Plan (WS-01-614). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Eberlien, J. 2002b. Cache-Aspen Prescribed Fire (WS-01-615). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Eberlien, J. and V. Primbs. 2002. Logan Road Decommissioning (WS-01-612). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Eckert, R.E., Jr. and J.S. Spencer. 1986. Vegetation response on allotments grazed under rest-rotation management. Journal of Range Management. 39: 166-174.

Eckert, R.E., Jr. and J.S. Spencer. 1987. Growth and reproduction of grasses heavily grazed under rest-rotation management. Journal of Range Management. 40: 156-159.

Evans, E.W. 1993. Biological control of weeds through use of introduced insects. Logan, Utah. Utah State Univ. Extension Fact Sheet No. 87. 3 p.

Federal Interagency Stream Restoration Work Group. 1998. Stream corridor restoration, principles, processes, and practices.

Fleischner, T. L. 1994. Ecological costs of livestock grazing in Western North America. Conservation Biology 8: 629-644.

Gillen, R.L.; W.C. Krueger; R.F. Miller. 1984. Cattle distribution on mountain rangelands in northeastern Oregon. Journal of Range Management. 37(6): 549-553.

Gillio, D.A. 1978a. Cultural Resource Survey of Jebo Creek Timber Sale (WS-78-70). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Gillio, D.A. 1978b. Cultural Resource Survey of Tuft's Creek/Slideout Timber Sale (WS-78-80). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Gneiting, D.J. et al. 2001. 2000 Utah Agricultural Statistics and Utah Department of Agriculture and Food Annual Report. Utah Department of Agriculture and Food. Salt Lake City.

Gomez, D. 1994. Conservation assessment for the spotted frog (*Rana pretiosa*) in the Intermountain Region USFS.

Graham, R.T., R.L. Rodriguez, K. M. Paulin, R. L. Player, A. P. Heap, and R. Williams. 1999. The Northern Goshawk in Utah: Habitat assessment and management recommendations. USDA Forest Service General Technical Report Rocky Mountain Research Station, GTR-22.

Hargis, C.D., C. McCarth, and R.D. Perloff. 1994. Home ranges and habitats of northern goshawks in eastern California. Studies in Avian Biology 16: 66-74.

Hart, R.H., S. Clapp, and P.S. Test. 1993. Grazing strategies, stocking rates, and frequency and intensity of grazing on western wheatgrass and blue grama. Journal of Range Management. 46(2):122-126.

Hart, R.H., M.J. Samuel, P.S. Test, M.A. Smith. 1988. Cattle, vegetation, and economic response to grazing systems and grazing pressure. Journal of Range Management. 41(4):282-286.

Harvey, M.J., J.S. Altenbach, and T.L. Best. 1999. Bats of the United States.

Hasenyager, R.N. 1980. Bats of Utah. Utah Department of Wildlife Resources. Salt Lake City. Publication No. 80-15.

Hay, K.G. 1958. Beaver census methods in the Rocky Mountain region. Journal of Range Management. Vol. 22(4).

Hayward, G. D. and J. Verner, tech. editors. 1994. Flammulated, boreal, and great gray owls in the United States: A technical conservation assessment. Gen. Tech. Rep. RM-253. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experimental Station. 214 p. 3 maps.

Heinowski, A. 1982. 1982 Small Mammal Survey – Big Creek.

Hickman, T., and R.F. Raleigh. 1982. Habitat Suitability Index Models : Cutthroat Trout. U.S.D.I. Fish and Wildlife Service. FWS/OBS-82/10.5. 38 p.

Hill, Rebecca L. 2000. Suggestions for Conservation of the Three-toed Woodpecker (Picoides tridactylus). Fishlake National Forest, Richfield Ranger District. 13 pp.

Hodges, K.E. 2000a. The ecology of snowshoe hares in northern boreal forests. Chapter 6 *In:* Ruggiero,L.F., K. B. Aubry, S. W. Buskirk, et al., tech. eds. Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 p.

Hodges, K.E. 2000b. Ecology of snowshoe hares in southern boreal and montane forests. Chapter 7 *In:* Ruggiero, L.F., K. B. Aubry, S. W. Buskirk, et al., tech. eds. Ecology and conservation of lynx in the United States. Univ. Press of Colorado. Boulder, CO. 480 p.

Hogrefe, T. C. 2002. Boreal toad (*Bufo boreas boreas*) conservation plan (draft).

Holechek, J.L., R.D. Pieper, and C.H. Herbel. 2001. Range management: principles and practices, 4th ed. Prentice-Hall, Inc, New Jersey. 587 p.

Hormay, A.L. 1970. Principles of rest-rotation grazing and multiple-use land management. U.S. Department of Agriculture, Forest Service. Washington, D.C. Training Text 4 (2200).

Hormay, A.L. and M.W. Talbot. 1961. Rest-rotation grazing…A new management system for perennial bunchgrass ranges. U.S. Department of Agriculture, Forest Service. Production Research Rept. No. 51. 43 p.

Howe, F.P. 1996. Breeding status of Utah's neotropical migratory birds. Utah Department of Wildlife Resources. Salt Lake City, Utah.

Hyder, D.N., W.A. Sawyer. 1951. Rotation-deferred grazing compared to season-long grazing on sagebrush-bunchgrass ranges in Oregon. J. Range Management. 4(1):30-34.

Janson R. G. 2002. The Pygmy Rabbit from Utah to Montana. Montana Cooperative Wildlife Research Unit, University of Montana. Missoula, MT. 41pp.

Jensen, J. C. 1984. Perspectives on BLM forage allocation: calculations with special reference to the limiting factor approach. In: Developing strategies for rangeland health. National Research Council, National Academy of Sciences. Westview Press, Boulder, Colorado. Pp. 473-528.

Johnson, M.K. 1979. Foods of primary consumers on cold desert shrub-steppe of southcentral Idaho. Journal of Range Management 32(5): 365-368.

Johnson, M. 1982. Response of small mammals to livestock grazing in southcentral Idaho. Journal of Range Management Vol. 35(1).

Kaltenecker, J., and M. Wicklow-Howard. 1994. Microbiotic soil crusts in sagebrush habitats of southern Idaho. Contract Report. On file with: Interior Columbia Basin Ecosystem Management Project, Walla Walla, WA. 48 Pp.

Kershner, J.L. 1995. Bonneville cutthroat trout. Pages 28-35 in M. K. Young, Tech. Ed. Conservation assessment for inland cutthroat trout. General Technical Report RM-256. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 61 p.

Krebs, C.J., and J.H. Meyers. 1974. Population cycles in small mammals. Adv. In Ecol. Res. 8: 267-399.

Landry J. 1982. Habitat used by ruffed grouse in northern Utah. Unpublished MS Thesis. Utah State University, Logan.

Litvaitis, J., A. Sherbourne, and J.A. Bissonette. 1985. Influence of understory characteristics on snowshoe hare habitat use and density. Journal of Wildlife Management 49: 866-873.

Loeffler, C., Coordinator/Editor. 1998. Conservation plan and agreement for the management and recovery of the southern Rocky Mountain population of the boreal toad (*Bufo boreas boreas*).

MacCracken, J.G. and R.M. Hansen. 1984. Seasonal foods of blacktail jackrabbits and Nuttall cottontails in southeastern Idaho. Journal of Range Management 37(3): 256-259.

McCabe, D. 2002. Flammulated owl study 2002. Progress Report. Ogden Ranger District, Wasatch-Cache National Forest. Ogden, Utah.

McCluskey, D.C. 1978. Riparian Zone Inventory Report.

McFadden, T. 1979. A Cultural Resource Survey of the Peter Sinks Timber Sale (WS-79-93). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Medin, D. and W. Clary. 1990. Bird and small mammal populations in a grazed and ungrazed riparian habitat in Idaho. Research Paper INT-425. USDA Forest Service, Intermountain Research Station.

Mika, M. 2000. Flammulated owl study 2000. Progress Report. Ogden Ranger District, Wasatch-Cache National Forest. Ogden, Utah.

Mika, M. 2001. Flammulated owl study 2001. Progress Report. Ogden Ranger District, Wasatch-Cache National Forest. Ogden, Utah.

Mika, M. 2003. Prey base differences and reproductive output of flammulated owls (Otus flammeolus) in northern Utah. Manuscript of a journal article submitted to the faculty of Brigham Young University in partial fulfillment of the requirements for the degree of Master of Science, Brigham Young University, Provo, Utah.

Mlazovsky, M. 1982a. A Cultural Resource Survey of the South Sink Road Project (WS-82-177). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Mlazovsky, M. 1982b. A Cultural Resource Survey of the Upper Jebo/Tufts Creek Timber Sale (WS-82-180). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Mlazovsky, M. 1985. Log Cabin Hollow Timber Sale (WS-85-302). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Mueggler, W.F. 1988. Aspen community types of the Intermountain Region. Gen. Tech. Rept. INT-250. Ogden, UT: USDA Forest Service, Intermountain Research Station. 135 p.

Mueggler, W. F. 1985. Vegetation associations. Pages 45-55 *in* N. V. DeByle and R. P. Winokur, eds. Aspen: ecology and management in the western United States. USDA For. Serv. Gen. Tech. Rept. RM-GTR-119. Rocky Mountain Station, Fort Collins, Colorado.

Mueggler, W.F. and R.B. Campbell Jr. 1986. Aspen community types of Utah. USDA Res. Pap. INT-362. Ogden, UT.

Muir, A.R. 1992. A Critical View of United States Forest Service Grazing Policy and Some of Its Effects upon the Livestock Industry as Represented in Rich County, Utah and the North Rich Grazing Association in Particular. Rangeland Enterprises, unknown location.

National Research Council. 2002. Riparian areas: functions and strategies for management. National Academy Press, Washington, DC.

NatureServe. 2000, 2001, 2002. Web site: http://www.natureserve.org/.

Oliver, G.V. 2000. The bats of Utah: A literature review. Utah Department of Wildlife Resources. Salt Lake City, Utah. Publication No. 00-14.

Olson, R. and W.A. Hubert. 1994. Beaver: Water resources and riparian habitat manager. University of Wyoming.

Padgett, Wayne G., Andrew P. Youngblood, and Alma H. Winward. 1989. Riparian community type classification of Utah and southeastern Idaho. R4-Ecol-89-01. U.S. Department of Agriculture, Forest Service, Intermountain Region. Ogden, Utah. 191 p.

Parrie, M. 2000. The Northwestern Shoshone. In: A History of Utah's American Indians, edited by Forrest S. Cuch. Utah Division of Indian Affairs and Utah State Division of History, Salt Lake City.

Parrish J., F. Howe, and R. Norvell. 2002. Utah partners in flight avian conservation strategy version 2.0. Publication Number 02-27. Utah Division of Wildlife Resources.

Parson, R.E. 1996. A History of Rich County. Utah State Historical Society, and Rich County Commission.

Patla, S.M. 1994. Investigation of the northern goshawk nest site location in relation to riparian areas in the Centennial Mountains. Draft Final Report. St. Anthony ID: U.S. Department of Agriculture, Forest Service, Targhee National Forest. 59 p.

Peterson, C.S. and Linda E. Speth. 1980. A History of the Wasatch-Cache National Forest, Utah State University, Logan.

Pfankuch, D.J. 1975. Stream reach inventory and channel stability evaluation. USDA Forest Service, R1-75-002. Government Printing Office #696-260/200, Washington D.C. 26 p.

Platts, W. S. and R. L. Nelson. 1985. Stream habitat and fisheries response to livestock grazing and instream improvement structures, Big Creek, Utah. Journal of Soil and Water Conservation 40: 374-379.

Ragotzkie K. and J. Bailey 1991. Desert mule deer use of grazed and ungrazed habitats. Journal of Range Management 44(5): 487-490.

Reynolds, R.T., R.T. Graham, M.H. Reiser, R.L. Bassett, P.L. Kennedy, D.A. Boyce, G. Goodwin, R. Smith, and E.L. Fisher. 1992. Management Recommendations for the Northern Goshawk in the Southwestern United States. USDA Forest Service General Technical Report RM-217.

Rinne, J. N. 1999. Fish and grazing relationships: The facts and some pleas. Fisheries 24: 12-21.

Roath, L. R. and W. C. Krueger. 1982a. Cattle grazing influence on a mountain riparian zone. Journal of Range Management 35(1): 100-103.

Roath, L. R. and W. C. Krueger. 1982b. Cattle grazing and behavior on a forested range. Journal of Range Management 35: 332-338.

Rosgen, D. 1996. Applied River Morphology. Wildland Hydrology. Pagosa Springs, Colorado.

Ruediger, B. et al. 2002. Canada Lynx Conservation Strategy.

Ruediger, Bill, Jim Claar, Steve Gniadek, Bryon Holt, Lyle Lewis, Steve Mighton, Bob Naney, Gary Patton, Tony Rinaldi, Joel Trick, Anne Vandehey, Fred Wahl, Nancy Warren, Dick Wenger, and Al Williamson. 2000. Canada lynx conservation assessment and strategy. USDA Forest Service, USDI Fish and Wildlife Service, USDI Bureau of Land Management, and USDI National Park Service. Missoula, MT.

Ruggiero, L.F., K. B. Aubry, S. W. Buskirk, et al., technical editors. 2000. Ecology and conservation of lynx in the United States. University Press of Colorado. Boulder, Colorado.

Sauer, J.R., J.E. Hines, G. Gough, I. Thomas, and B.G. Peterjohn. 1997. The North American Breeding Bird Survey Results and Analysis. Version 96.3. Web site: http://www.mbr.nbs.gov/bbs/bbs.html. Patuxent Wildlife Research Center, Laurel, Maryland.

Shaver, M. 1992. Slideout Timber Sale (WS-92-458). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Shewmaker, G., H.F. Mayland, R.C. Rosenau, and K.H. Asay. 1989. Silicon in C-3 grasses: Effects on forage quality and sheep preference. Journal of Range Management. 41(2)122-127.

Shiflet, T.N., editor. 1994. Rangeland Cover Types of the United States. Society for Range Management. Denver, Colorado.

Sigler, W. F., and J. W. Sigler. 1996. Fishes of Utah: A Natural History. University of Utah Press. Salt Lake City, Utah.

Spielmaker, D. 2000. Green for Good. Utah Science 60: 2-19.

Stebbins, R. C. 1985. A field guide to western reptiles and amphibians. Houghton Mifflin Co., Boston. 366 p.

Stebbins, R. C. and N. W. Cohen. 1995. A natural history of amphibians. Princeton University Press.

Thacler C. Jr. 1972. Taxonomic status of the pocket gophers, *Thomomys Idahoensis* and *Thomomys Pygmaeus* (Rodentia, Geomydae). Journal of Mammalogy Vol. 53 (3).

Thompson, Charmaine. 1998. Bear Hodges Analysis Area Survey (WS-98-567). Manuscript on file at the Wasatch-Cache National Forest's Supervisor's Office, Salt Lake City, Utah.

Thompson, P. 1999. Amphibian surveys in the Northern Region, 1998. Utah Division of Wildlife Resources. Annual Report. 13 p.

USDA Natural Resources Conservation Service. 1982. Soil Survey of Rich County, Utah. Salt Lake City, Utah.

USDA Forest Service. 1962. Range Condition and Trend Studies. Map and Report. Logan Ranger District, Logan, Utah. Wasatch-Cache National Forest.

USDA Forest Service. 1964. R-4 Range Analysis Handbook. Ogden, Utah.

USDA Forest Service. 1990. Sinks / Log Cabin Hollow Area Analysis. Logan Ranger District, Wasatch-Cache National Forest. Logan, Utah. 39 pp.

USDA Forest Service. 1992. Risk assessment for herbicide use in Forest Service Regions 1, 2, 3, 4 and 10 and on Bonneville Power Administration sites.

USDA Forest Service. 1993. Range Analysis Handbook. Intermountain Region. Ogden, Utah.

USDA Forest Service. 1996. Final Environmental Impact Statement, Rangeland Health (RHEIS) Wasatch-Cache National Forest. Salt Lake City, Utah.

USDA Forest Service. 1998. Sub-regional assessment of properly functioning conditions for areas encompassing the National Forests of northern Utah. Report on file.

USDA Forest Service. 2000. Draft memo dated March 21, 2000 from Charlie Condrat, hydrologist, and Paul Flood, soil scientist, to Brian Ferebee, Logan District Ranger of the Wasatch-Cache National Forest, regarding review of Willow Creek Ecology documents.

USDA Forest Service. 2001. Draft Environmental Impact Statement, Forest Plan Revision, Wasatch-Cache National Forest. Salt Lake City, Utah.

USDA Forest Service. 2002a. Report to GYCC. Wolverine natal denning habitat mapping and field surveys, Caribou-Targhee National Forest.

USDA Forest Service. 2002b. Cache Aspen/Mountain Brush Treatments. Environmental Assessment. Wasatch-Cache National Forest. Ogden, Utah.

USDA Forest Service. 2003. Revised Forest Plan, FEIS, and Record of Decision, Wasatch-Cache National Forest. Salt Lake City, Utah.

USDI Fish and Wildlife Service, 2003. Endangered and Threatened Wildlife and Plants; Notice of Remanded Determination of Status for the Contiguous United States Distinct Population Segment of the Canada Lynx; Clarification of Findings; final rule. Federal Register. 68(128).

Utah Department of Agriculture and Food Annual Report. 2001. Utah Department of Agriculture and Food, Salt Lake City, Utah.

Utah Department of Environmental Quality. 2000a. Standards of Quality of Waters of the State, Section R317-2, Utah Administrative Code. Utah Department of Environmental Quality, Division of Water Quality.

Utah Department of Environmental Quality. 2000b. Utah Water Quality Assessment Report to Congress 2000. Utah Department of Environmental Quality, Division of Water Quality.

Utah Division of Wildlife Resources. 1999. Managing for sustainable mule deer populations. Cache wildlife management unit.

Utah Division of Wildlife Resources. 2003. Gray wolves in Utah. Species Information Update.

Vallentine, John F. 1989. Range development and improvements, Third Edition. Academic Press, Inc. Harcourt Brace Jovanovitch, Publishers.

Wagner, B., S. Harnis, and C. Huffman. 1980. 1980 Rich County riparian small mammal inventory.

Wasatch-Cache National Forest. 1996. Interim Soil Survey of the Wasatch Cache National Forest, Logan District Area, Part of Cache County, Utah. Forest Supervisors Office, Salt Lake City, Utah.

Wasatch-Cache National Forest. 1999a. Memorandum regarding Temple Fork/Spawn Creek bacterial monitoring to Brian Ferebee, Logan District Ranger from Charlie Condrat, Forest Hydrologist, dated February 23, 1999. Salt Lake City, Utah.

Wasatch-Cache National Forest. 1999b. Letter from Charlie Condrat, Forest Hydrologist to Rick Summers, NPS hydrologist at the Utah Department of Environmental Quality, Division of Water Quality regarding the review of 1998 water quality monitoring data, dated February 26, 1999. Salt Lake City, Utah.

Wasatch-Cache National Forest. 1999c. Monitoring Report, North Rich Allotment September 29, 1999. Paul Flood, Soil Scientist, Wasatch-Cache National Forest. Salt Lake City, Utah.

Wasatch-Cache National Forest. 2000. Draft memo dated March 21, 2000 from Charlie Condrat, hydrologist and Paul Flood, soil scientist to Brian Ferebee, Logan District Ranger regarding review of Willow Creek Ecology documents. Salt Lake City, Utah.

Wasatch-Cache National Forest. 2003. Unpublished review of Albert F. Potter's Diary in the Cache and Rich County areas, dated March 3, 2003 by Charlie Condrat, hydrologist, Wasatch-Cache National Forest. Salt Lake City, Utah.

Washington Department of Fish and Wildlife. 1995. Washington state recovery plan for the pygmy rabbit. Wildlife Management Program, Wash. Dept. Fish and Wildlife., Olympia, 73pp.

Watts, C.R.; Eichhorn, L.C.; Mackie, R.J. 1987. Vegetation trends within rest-rotation and season-long grazing systems in the Missouri River Breaks, Montana. Journal of Range Management. 40(5) 393-396.

Weber, D. A. 1975. Blue grouse ecology, habitat requirements, and response to habitat manipulation in North Central Utah. Report to USDA Forest Service, UDWR, and Utah State University.

Willow Creek Ecology. 1996. Letter regarding range conditions on the Little Bear Sheep and North Rich Cattle Allotments from John G. Carter dated August 22, 1996 including maps, and photographs to Deborah Johnson, Logan District Ranger.

Willow Creek Ecology. 1998a. Investigation of Spawn Creek, Utah Coliform Contamination and Stream Bank Stability in Relation to Cattle Grazing. February 23, 1998. Mendon, Utah.

Willow Creek Ecology. 1998b. Investigation of Ground Cover, Soil Conditions, Riparian Areas and Forest Practices in the Little Bear Sheep and North Rich Cattle Allotments. February 23, 1998. Mendon, Utah.

Willow Creek Ecology. 2000. Analysis of Ground Cover in Forest Openings in the Bear Hodges Analysis Area, Little Bear Sheep Allotment, North Rich Cattle Allotment, Wasatch-Cache National Forest, Utah. October 27, 2000. By John G. Carter, Ecologist. Mendon, Utah

Winward, A.H. 1999, 2002. Personal Communications. Regional Ecologist (ret.), Intermountain Region, USDA Forest Service.

Wolfe, M.L., N.V. Debyle, C. S. Winchell, and T. R. McCabe. 1982. Snowshoe hare cover relationships in northern Utah. Journal of Wildlife Management 46: 662-670.

Wolff, J.O. 1978. Food habits of snowshoe hares in interior Alaska. Journal of Wildlife Management 42: 148-153.

Wolff, J.O. 1980. The role of habitat patchiness in the population dynamics of snowshoe hares. Ecological Monographs 50: 111-130.

CHAPTER 8
Comments and Responses
For the
North Rich Allotment Draft Environmental Impact Statement

This chapter provides the Forest Service response to comments received on the DEIS and gives a reference to additional clarification in the FEIS (where provided).

The Draft Environmental Impact Statement (DEIS) for the North Rich Allotment was released for public review on June 27, 2003. Copies were sent to interested parties identified during the scoping process and to local, state and federal agencies.

Twenty-four letters were received during the comment period, which ended on August 25, 2003. All letters were reviewed and summarized by the interdisciplinary team members. All summarized comments are included in this chapter for public review. Individual letters are on file in the project record.

Changes in the Final Environmental Impact Statement (FEIS) were based on the comments received on the DEIS and further analysis by the Forest Service. The changes in response to comments included addition of another alternative, the deferred rotation alternative and analysis of its estimated effects. The changes also included clarification of range condition (satisfactory and unsatisfactory acres), correction of capable acres, additional information on monitoring (completed and planned), additional information on the history of the allotment, information on the greater sage grouse, pygmy rabbit, and slickspot peppergrass (species recently added to the Intermountain Region Sensitive Species List), and minor editing changes.

Letter Number	Name	Comment	Response to Comment
1a	Mark Belles	While Alternative B represents a significant reduction in impacts, only Alternative C can begin the process of restoring the allotment to its natural conditions.	Thank you for your comment.
2a	WN Strickland	Would like Alternative B to include construction of an exclosure free of any grazing or recreational impacts to establish a baseline for comparison.	As noted in Section 3.4.9.1, Long-Term Rangeland Trend Monitoring, a reference site (baseline comparison site) was located on an ungrazed area immediately to the north of the allotment. No discernible recreation impacts have occurred on this site.
3a	Wildlife Management Institute	Grazing strategies need to be based on current scientific monitoring data.	An attempt has been made to use current literature to identify appropriate grazing strategies. This discussion is included in Section 4.6.3, Effects Analysis Methods and Assumptions.
3b	Wildlife Management Institute	The final EIS must address importance of AOP and sufficient resources to implement plan.	The annual operating plan (AOP) prescribes the annual actions that implement management decisions included in the Allotment Management Plan. It identifies the permittee's and the Forest's obligations for the current year. Resources available to implement the plan vary from year to year based on Congressional allocations of funds and, while it plays a role in managing the range program on the Forest, it does not determine the priorities for expenditures for implementation of AOPs.
3c	Wildlife Management Institute	Estimates of grazing capacity are exaggerated based on drought conditions.	Grazing capacity (Section 3.4.6) was determined based on production measurements for the allotment in the 1960's, but varies from year to year based on annual precipitation. Actual numbers and/or season of use are adjusted based on annual precipitation every year.

Letter Number	Name	Comment	Response to Comment
3d	Wildlife Management Institute	Reduce stocking rate to 40% of current stocking rates.	As shown in Section 3.4.6, Grazing Capacity, figures indicate the capacity of North Rich rangelands can sustain the current permitted number, given proper distribution and management. However, proper management has not always been the case, resulting in utilization standards being exceeded. The 1/3 reduction is based on the 3-pasture rest rotation grazing system. Numbers and/or season of use may be adjusted following three years of monitoring of actual use and distribution of livestock within the allotment (Sections 2.4.2.2 and 2.4.4.2).
3e	Wildlife Management Institute	Need to increase amount of riparian fencing.	Several areas have been identified for the installation of riparian fencing; the amount and areas vary by alternative. Additional fencing may be done in the future under additional nepa decisions.
3f	Wildlife Management Institute	Wants to make sure sufficient, scientific monitoring strategies are employed to document progress.	Long-term trend monitoring has followed Intermountain Region, Forest Service protocol (Forest Service Handbook 2209.21, Rangeland Ecosystem Analysis and Management Handbook). This information is used to document changes in rangeland conditions over time.
3g	Wildlife Management Institute	Must address impacts of livestock grazing on water quality and yields.	Impacts to water quality are addressed in Section 4.7.4.1 General Description of Effects. See response to comment 13b.
3h	Wildlife Management Institute	Riparian fencing projects will place additional grazing pressure on upland sites. Need to document effects.	Upland monitoring is included in Section 2.6, Monitoring Activities Common to All Alternatives.

Letter Number	Name	Comment	Response to Comment
3i	Wildlife Management Institute	Need to reconsider size of treatment areas (larger) to produce a measurable response.	The aspen treatment units in the allotment were identified in a larger analysis area that covered most of the Ogden and Logan Districts. Additional and more thorough analysis of the project area, including adjacent lands and existing conditions throughout the larger analysis area would be necessary to consider larger treatments in other aspen and/or sagebrush communities.
3j	Wildlife Management Institute	Concerned about wild ungulates and the effects they will have on aspen treatment areas. Wants them excluded from treatment areas.	Past aspen burns (Red Banks, Boulder Mountain, and Rock Creek) and natural fires (Spawn Creek and Edgar Fires) on the Ogden and Logan Ranger Districts have shown successful regeneration of aspen without the construction of exclosures to prevent the access of moose, elk, and deer. In some areas of the west (e.g. Jackson, WY), browsing by native ungulates is a concern. However, current native ungulate populations within the project area are at levels at which there should be little concern of excessive browsing on aspen saplings, based on the fires mentioned above.
3k	Wildlife Management Institute	Notes the importance of forage and cover for wildlife habitat. Wants stubble height to be used for grazing rates.	As noted in meeting notes from a November 4-5, 2003 U.S.D.A. Forest Service Range Directors Meeting (notes on file) a team has been formed between the Forest Service and Bureau of Land Management to review the scientific validity of using stubble height. The Forest will continue to evaluate this as an alternative method to percent forage utilization.
4a	Craig Axford, Utah Environmental Congress	Need to consider a "true restoration alternative" consistent with direction in revised Forest Plan for management prescription 5.1, properly functioning conditions, and desired future conditions. This Alternative would combine elimination of livestock grazing with vegetation treatments from Alternative B.	The decision-maker can select portions from each alternative to include in the decision, as long as they were included in the environmental analysis. Because of direction in the Forest Plan, vegetation treatments are likely in the future.

Letter Number	Name	Comment	Response to Comment
4b	Craig Axford, Utah Environmental Congress	Conclusions that reasonably foreseeable activities in the area will have a positive impact on water quality and soils are unsubstantiated. DEIS statements regarding dispersed recreation, Travel Plan amendments, and development of Shoshone ATV trail is inconsistent with conclusions.	Although use on the Shoshone Trail may increase, the WCNF Revised Plan emphasizes OHV Travel Management (Forest Plan page 4-28) to provide a variety of recreation access opportunities and to reduce user conflicts. Since the Shoshone Trail is located on the existing travel system and would not involve opening new routes, no additional impacts should occur on the trail. As stated in Section 4.4.5, Cumulative Effects, the majority of unauthorized routes occur during the hunting season. These illegal activities are not necessarily associated with the designation of existing roads and trails such as the "Shoshone Trail". It is just as likely that a designated trail would encourage users to try to maintain its special qualities, users taking ownership in it, and volunteers devoting time to maintain it. With additional emphasis on the trail it would be expected that it would be better maintained and travel regulations better enforced. It is for these reasons and the fact that certain riparian areas within the allotment are protected from grazing through the use of exclosures that the conclusion is made that there would be a positive effect to soil and water resources from these reasonably foreseeable activities.
4c	Craig Axford, Utah Environmental Congress	The DEIS fails to make the case that expenditures to support continued grazing of the North Rich Allotment provide sufficient benefit to the American people (Multiple Use Sustained Yield Act "that will best meet the needs of the American people.") to warrant continued grazing on economic grounds.	The decision will not be based solely on economic factors, but on an analysis of all environmental effects associated with grazing management. Based on the constraints of federal laws and regulations affecting the financial efficiency of the Forest Service grazing program, economic efficiency as a condition for grazing authorization is considered outside the scope of this analysis, as discussed in Chapter 1, Section 1.6.3 and Appendix H.

NORTH RICH ALLOTMENT

Letter Number	Name	Comment	Response to Comment
4d	Craig Axford, Utah Environmental Congress	Select Alternative C to best protect boreal toad. Protect potential boreal toad corridors between Tin Cup and other water sources.	Boreal toad populations will continue to be protected as they are identified through monitoring and riparian fencing. Monitoring in 2004 at Tin Cup Spring will include pit-tagging adult boreal toads, which will enable Forest Service biologists to estimate numbers and track movement between populations.
4e	Craig Axford, Utah Environmental Congress	Since livestock have documented presence in the exclosure area of the high-risk Bonneville cutthroat trout population, the conclusion that neither Alternative A or B are likely to impact "because of protection afforded by the exclosure" is unsubstantiated. Close the Allotment to make every effort to preserve this population.	Although a few livestock were documented within the Hells Hollow exclosure in 1999 and 2000, habitat conditions continued to improve, as discussed in Section 3.2.3. No livestock have been found in the exclosure since 2000. As discussed in Section 4.2, if the Hells Hollow fence is not maintained and livestock graze the area, this would likely exacerbate the situation and lead to removal of this population.
4f	Craig Axford, Utah Environmental Congress	An alternative that combines elimination of livestock grazing with restoration treatments including tall forbs should be considered.	See response to comment 4a.
4g	Craig Axford, Utah Environmental Congress	Concern that the combination of Bear Hodges timber sale, continued livestock grazing, and high levels of motorized and dispersed recreation will continue to aid in establishment of noxious weeds.	Noxious weeds will be treated in all alternatives, regardless of cause. Alternatives B and D take a more aggressive approach to noxious weed control. Preventative measures are included in timber sale activities as noted in the current Draft EIS for the proposed Bear Hodges 2 timber sale. In addition, the revised Forest Plan identified a forest-wide subgoal (3t) to "Improve Forest user's awareness of what noxious weeds are and how they spread and increase Forest users' active participation in reducing and preventing infestations".
4h	Craig Axford, Utah Environmental Congress	FEIS should include a more detailed discussion of consequences of continued grazing for wolf/prey habitat conditions and implications of livestock for wolf recovery in Utah.	The current status of the wolf is discussed in Section 3.9.2.1. Section 4.8.4.2 discusses the effects of the alternatives on the wolf and the effects to prey species on which wolves depend.

Letter Number	Name	Comment	Response to Comment
4i	Craig Axford, Utah Environmental Congress	Acknowledges discussion of Migratory Bird Treaty Act and Executive Order 13186. A restoration/no-grazing Alternative including restoration of aspen, riparian, and tall forb communities is vital to obligations under these.	All the alternatives will make improvements in varying degrees to the current condition in relationship to increasing the amount and diversity of understory vegetation, thus causing changes in habitat conditions for migratory birds in varying degrees by alternative. For some species this will be positive change, while for others it will not. For example, as discussed in Section 4.8.4.6, species that prefer open understory conditions will likely be less abundant under the no grazing alternative, while species which prefer dense understory conditions will likely increase under the same alternative.
5a	UDWR (RDCC)	Recommend splitting the allotment into several pastures, and practicing a high intensity, short duration grazing scenario	Typically a minimum of 7 to 8 pastures are required to adequately apply a high intensity, short duration grazing system. Historically, because of the difficulty in accessing fences for maintenance purposes, they have quickly fallen into disrepair. The cost of construction and maintenance of this amount of fence, as well as the cost of implementing a high intensity, short duration grazing system would be prohibitive in the current market.
5b	UDWR (RDCC)	With only 3 pastures, consider shortening the grazing period to reduce the chance of overgrazing	Numbers and/or season of use may be adjusted following three years of monitoring of actual use and distribution of livestock within the allotment (Sections 2.4.2.2 and 2.4.4.2).
5c	UDWR (RDCC)	When seeding after the proposed treatments, should seed by disking or drilling the seed	Appropriate and proven methods, such as disking or drilling seed, will be used for treatments where this occurs.
5d	UDWR (RDCC)	When burning aspen stands, recommend burned areas to be rested from livestock grazing for a minimum of two growing seasons	As noted in Section 4.6.9.1 Effects of past, present, and reasonably foreseeable future connected and cumulative actions, including the proposed action, the portion of the Edgar Fire burn area within the allotment was not rested and successfully regenerated.

Letter Number	Name	Comment	Response to Comment
6a	Dan Miller, Bear River Watershed Council	The Bear River Range is a critical conservation corridor for wildlife; the North Rich allotment is in the center of this corridor, which is critical for Canada lynx recovery; the EIS acknowledges the importance of the allotment to the lynx, but there has been no effort by the Forest Service to implement the "Canada Lynx Conservation Agreement" which it signed in 2000; the EIS must analyze the impacts to the Canada lynx and its habitat	Lynx analysis units do not occur within the allotment. It is considered a linkage area. The effects to the lynx and the prey species on which they depend, and standards and guidelines developed within the Lynx Conservation Strategy pertaining to linkage areas are addressed in Section 3.9.2.3 and Section 4.8.4.4. Additional information was added between the DEIS and FEIS.
7a	Jim Cane, Bridgerland Audubon	Another alternative should have been presented that eliminates grazing and proposes restorative treatments	See response to comment 4a.
7b	Jim Cane, Bridgerland Audubon	Alt. B proposes 3 pastures, but the south pasture contains about twice as many capable acres than either of the other two pastures	This has been noted in Sections 2.4.2.2, 3.4.5, and 3.4.6. The AUMs grazed each year will be dependent on available forage during that year. Also, the actual locations of fences may be modified to better distribute production among pastures.
7c	Jim Cane, Bridgerland Audubon	Statement made in the draft EIS that "the effects of the alternatives will be described in more detail in the Final EIS"; what then is missing from this draft? Is this incomplete?	While the DEIS was complete in the breadth of its analyses, it had not fully analyzed the depth of available research, which has been done to a greater degree in the FEIS. Also, that statement was made in the DEIS Summary, explaining that the FEIS Summary would be more detailed.
7d	Jim Cane, Bridgerland Audubon	It's important to exclude livestock grazing from fragile springs and riparian areas; more fenced exclosures and more intensive livestock management seems appropriate; why not plan for 2 to 3 riparian exclosures per year?	We agree it is important to protect wetland and riparian resources and have recently constructed exclosures at Tin Cup Springs and lower Saddle Creek. We will consider additional exclosures in the future depending upon resources available.

Letter Number	Name	Comment	Response to Comment
7e	Jim Cane, Bridgerland Audubon	Recent field tour found Elk Spring and pond trampled by cows; at Rex Pond, sheep have trampled and created a dustbowl 100's of feet across; at Cheney pond, cows have churned the stream banks to powder and mowed down the willows to 3" stubble; livestock are never found more than 200 feet from water; good water and springs are precious on this allotment, but also focus of livestock degradation	See response to comment 7d.
7f	Jim Cane, Bridgerland Audubon	Would like to see more detail on what structures are planned at each spring and how water will be made available to livestock; should be a priority to provide water troughs away from the riparian zone	Locations and types of structures for each spring have not been identified at this time. An example of a trough and pipeline is the one constructed at Tin Cup Spring. Water will continue to be made available away from riparian areas within the allotment.
7g	Jim Cane, Bridgerland Audubon	We are concerned about the potential for wildlife to become entangled in barbed wire fencing; the DEIS offers no data on entanglement problems for deer, elk, or moose, nor about fencing designs to avoid these problems	The EIS addresses the concern in Section 4.8.4.2. Entanglement does occur but as stated within the EIS these effects are minor. This information is based on general observations of other fences on the district. We have added information to the FEIS regarding fence design to reduce entanglement. Also, the pasture and boundary fences being installed are letdown fences. These fences should only be standing shortly before cattle come on to the allotment until shortly after they are removed.
7h	Jim Cane, Bridgerland Audubon	The proposed monitoring schedule for water quality (every 5 years) is inadequate to make effective changes in management; this must be done more frequently, monthly during the season, or at least annually	A five-year monitoring frequency was chosen because the purpose of the monitoring is to determine the trend toward desired condition. Changes in stream stability occur slowly, and changes are expected to be discernable in about 5 years.

Letter Number	Name	Comment	Response to Comment
7I	Jim Cane, Bridgerland Audubon	The DEIS claims that stock ponds create habitat for boreal toad, suggesting grazing activities result in improved habitat, but also states that areas near water are often in poor condition and provide limited habitat for the toad; heavily used stock ponds provide improved conditions for livestock only	Section 3.2.3 describes in more detail the occurrence and habitat of the boreal toad in the allotment, as well as the effects of cattle grazing on amphibians. This section also notes that, with the reduction in beaver numbers, stock ponds are often the only habitat available to boreal toads. Section 4.2.4 describes the direct and indirect effects of each alternative on the boreal toad.
7j	Jim Cane, Bridgerland Audubon	The Forest Plan did not name the boreal toad as an indicator species, but this toad would make for a good indicator of wetland areas of the forest; these areas are threatened by livestock grazing	Management indicator species (MIS) were identified in the forest planning process for the WCNF. The addition of the boreal toad as an MIS is beyond the scope of this project.
7k	Jim Cane, Bridgerland Audubon	In other parts of the forest, it would be useful to protect wet meadows and perched fens from grazing activities	Protection of wet meadows and riparian areas are important to the WCNF. The WCNF has protected riparian areas in other parts of the forest such as at Tin Cup Spring and the lower part Saddle Creek.
7I	Jim Cane, Bridgerland Audubon	If riparian areas cannot be managed in a sound manner, we would like to see management contingencies (e.g., elimination of livestock grazing) provided for in the plan if ranchers fail to meet the mark	As noted in Alternatives B and D, several of the highest value riparian areas will be fenced. In addition, utilization standards will be applied that should maintain satisfactory conditions or move unsatisfactory riparian areas toward desired conditions.
7m	Jim Cane, Bridgerland Audubon	ATV use is an ongoing and growing concern; some authorized roads on the allotment are in poor shape; rather than adding motorized loops, consider closing or repairing degraded routes	The increasing popularity of ATV riding is acknowledged in the cumulative effects section. However, decisions regarding ATV use and travel planning are beyond the scope of this project.
7n	Jim Cane, Bridgerland Audubon	The DEIS fails to provide a balanced economic analysis; the allotment accounts for only 0.04% of the Rich CO economy; the implied economic value of grazing on this allotment is overstated; the costs associated with fencing in the preferred alternative are large compared to the public benefits, amounting to a sizeable subsidy to these ranchers	See response to comment 4c.

Letter Number	Name	Comment	Response to Comment
7o	Jim Cane, Bridgerland Audubon	The DEIS should refrain from making justifications for grazing based on the permittees maintaining their private land as plant and wildlife habitat and preserving ways of life for livestock producers; the public needs to know estimates of the real economic costs and benefits	See response to comment 4c.
7p	Jim Cane, Bridgerland Audubon	Poor ground cover and heavy sage or coneflower populations were observed in many places, so only chance for recovery is rest; smaller pastures, reducing AUMs, and rest periods are welcome, but in the DEIS, if it takes 8-10 years for aspen to rejuvenate after fire, how will this work and allow each of the 3 pastures to be rested? Fencing will be required (not may be used, as in the DEIS) around burned areas; what about more pastures, reduce grazing by 50% and more intensive resting to provide for sufficient rest?	See response to comment 5d.
7q	Jim Cane, Bridgerland Audubon	Monitoring upland and riparian use annually is inadequate to protect vegetation and habitats from overuse; this should be done at least monthly during the grazing season	The explanation of "annual monitoring" has been clarified in Appendix I. "Annual" monitoring is monitoring that is conducted each year, several times throughout the grazing season, to determine whether or not proper use is being reached.

Letter Number	Name	Comment	Response to Comment
7r	Jim Cane, Bridgerland Audubon	Concerned that the status of beavers, trout, goshawks and stubble height may be insufficient indicators of ecological health, particularly on dry allotments (such as North Rich); we encourage the FS to add a few more indicator species to provide clues on the success of rehabilitation efforts	Management indicator species (MIS) were identified in the forest planning process for the WCNF. The identification of additional MIS is beyond the scope of this project. In addition to beaver, trout, and goshawk, the snowshoe hare is a MIS being monitored within the allotment. The EIS addresses snowshoe hares in Sections 3.9.2.2 and 4.8.4.3. Numerous other species that are not MIS, such as neotropical birds, are also being monitored within the allotment to assess trends, as discussed in Sections 3.9.2.5, 4.8.4.6, and Appendix F. The results of the USFS surveys are displayed in Appendix E and UDWR survey information is located in the project file. These surveys (point counts within a transect) have been set up to monitor trends in species numbers. In addition, long-term trend monitoring of vegetation and ground cover conditions will be conducted every 5 years to identify the success of rehabilitation efforts.
7s	Jim Cane, Bridgerland Audubon	Suggest monitor willow growth and other native shrubs or forbs that are preferred by grazers; need to add species to monitor that indicate habitat health in sage and tall forb communities; monkey flower is suggested for seeps and springs; other species suggested include lupine, elderberry, white ball clover, camas lily, and western coneflower	Section 1.5.6, Desired Conditions, Vegetation identifies those species desired in each cover type on the allotment. These will be monitored to indicate rangeland health.
7t	Jim Cane, Bridgerland Audubon	5-minute counts of hummingbirds and bumblebees would be informative of wildflower community condition; consult an ornithologist for a mix of neotropical migrants which can be monitored to track improvements to the small springs on the allotment	Neotropical migratory birds have been surveyed within the allotment over the past few years on designated routes and will continue to be monitored as discussed in Sections 3.9.2.5 and 4.8.4.6, and Appendix F.
7u	Jim Cane, Bridgerland Audubon	Proposed monitoring frequency of boreal toads is too infrequent; consider at least every year; don't overlook use of volunteers for monitoring efforts	Boreal toads will be surveyed every year at ponds where they have been identified. All stock ponds are surveyed before any maintenance is initiated.

Letter Number	Name	Comment	Response to Comment
7v	Jim Cane, Bridgerland Audubon	The need to require 2 to 4 riders, 24/7, indicates how little the permittees can be relied upon to police themselves; for monitoring use and damage to riparian areas, the permittees cannot be relied upon to invest the time or skills; are there examples of the FS requiring and permittees agreeing to early removal of livestock because of use beyond accepted levels?	Section 3.4.3, Grazing History includes information on reductions in livestock numbers on the allotment. In addition, Appendix C includes annual history of use on the allotment between 1921 and 1998.
7w	Jim Cane, Bridgerland Audubon	Need better data on how long land must be rested to recover from intensive grazing and how this will be accommodated on just 3 pastures	A review of literature on grazing systems and on stocking rates has been added to Section 4.6.3, Effects Analysis Methods and Assumptions.
8a	Spencer Gibbons, Utah Farm Bureau	All of the permittees are concerned about the reduction of cattle numbers and how this would adversely effect their operations	This issue is considered in Chapter 1, Section 1.6.2.4, and is the basis for the addition of Alternative D in Chapter 2, Section 2.4.4. The socioeconomic effects to permittees are discussed in Chapter 4, Section 4.5.
8b	Spencer Gibbons, Utah Farm Bureau	We oppose reduction in grazing until monitoring clearly demonstrates a downward trend in range carrying capacity; according to one of the riders, the feed on the allotment is only utilized about 30% or less.	Historical notes on file, and illustrated in Table 3.8, show a higher utilization than 30 percent in many of the key areas monitored. Conditions in the allotment have been monitored since the 1960's and at least ground cover conditions have not significantly changed in that period (see Table 3.7). Conditions in these areas do not meet, nor are they moving toward desired conditions and are, therefore, in unsatisfactory condition.
8c	Spencer Gibbons, Utah Farm Bureau	The permittees have a concern over lack of good, viable water in 1 or 2 of the proposed 3 pastures; the Farm Bureau supports the desire of the permittees to develop new water resources to make their operations more productive and viable	Many water developments have been constructed in the past but a considerable number have not been maintained (see Figure 3.3 and Appendix D). The inventory of improvements will be completed and the need for additional developments will be considered with the implementation of any of the alternatives.

Letter Number	Name	Comment	Response to Comment
9a	Scott McKendrick, USU Extension	The appropriate steps should be the development of water in the central and southern portions in order to provide less pressure on the north end, then rest rotation and treatments as needed for vegetation improvement.	See response to comment 8c.
9b	Scott McKendrick, USU Extension	Utilization of temporary (electric) fencing may be advantageous to costs and flexibility. Hopefully this would allow maintaining current cattle numbers or even an increase while addressing vegetation improvement.	Alternative D, including the use of temporary fencing, has been added to Chapter 2, Section 2.4.4 and analyzed in Chapter 4.
10a	Robert Stewart, USDI, Office of Env. Policy, Denver	A map showing rangelands in downward trend or in unsatisfactory condition would be helpful.	A map of rangeland conditions has been added to Section 3.4.5, Existing Rangeland Conditions.
10b	Robert Stewart, USDI, Office of Env. Policy, Denver	A map showing monitoring sites and key areas would be helpful.	A map of long-term trend monitoring site locations is available in the project file.
10c	Robert Stewart, USDI, Office of Env. Policy, Denver	The FEIS should identify actions that will be taken to mitigate impacts of trespass and unauthorized grazing, and how this relates to improvement of range conditions.	Section 2.6, Monitoring describes the steps to be taken in these situations. In addition, Appendix K has been added, which includes direction from Section 16.21 in Forest Service Handbook 2209.13, Permit Violations.
10d	Robert Stewart, USDI, Office of Env. Policy, Denver	The FEIS should explain more clearly how reducing numbers by 1/3 and resting one pasture (without reducing cattle density or time on the allotment) will improve conditions.	In addition to the 1/3 reduction in livestock numbers, Section 4.6.4.2, Alternative B, notes that "Because of a combination of rest and the applied lower utilization rate on unsatisfactory condition communities, this alternative will allow the grazed plants to recover vigor, produce seed, and reproduce during rested years."
10e	Robert Stewart, USDI, Office of Env. Policy, Denver	Feasibility of additional off-site water locations should be investigated. All natural springs and seeps should be protected by fencing them off.	See response to comment 7d.

Letter Number	Name	Comment	Response to Comment
10f	Robert Stewart, USDI, Office of Env. Policy, Denver	Criteria used to assess readiness of treated areas to be grazed were not identified.	All seedings in treated areas must be protected through the second growing season or until seeded species are well established. This criterion has been to Chapter 2, Section 2.4.2.5 and Section 2.4.4.6.
10g	Robert Stewart, USDI, Office of Env. Policy, Denver	The method of noxious weed control was not noted.	A discussion of the treatments (methods) likely to be used for noxious weed control has been added to each alternative in Chapter 2.
10h	Robert Stewart, USDI, Office of Env. Policy, Denver	Clarify the pattern and placement of treatments and survey for pigmy rabbits and sage grouse.	Treatments will occur on about 600 acres of sagebrush in the northern portion as shown on Table 2.2 and Figure 2.3. This is about 10 percent of the sagebrush in the allotment (Table 3.6). The entire 600 acres of sagebrush will not be killed, but will be thinned (using spike or rotobeating) or killed in a mosaic pattern (with prescribed fire). Known habitat for the pygmy rabbit occurs at lower elevations to the east within areas of contiguous, large-sized sagebrush (such as basin big sagebrush subspecies). UDWR has conducted surveys for the pygmy rabbit. USFS will conduct surveys in the sagebrush treatment areas prior to any treatment. Sage grouse habitat does not occur within the project area, but does occur to the east. Surveys for the sage grouse have been conducted by UDWR for several years primarily centered on locating leks and population counts at lek sites. Information regarding the pygmy rabbit and sage grouse was added to the FEIS, Section 3.9.2.4 and Section 4.8.4.5.
10i	Robert Stewart, USDI, Office of Env. Policy, Denver	INFISH suggests a 150-foot buffer between burn boundary and a stream occupied by cold-water fish species.	A riparian habitat conservation area (RHCA) will be established on an intermittent stream in the Cheney-Richardson Fork aspen burn area. A 50-foot stream buffer will be implemented according to INFISH requirements for “seasonally flowing or intermittent streams”. There are no treatments near any cold water fish-bearing streams (requiring a 150-ft buffer).

Letter Number	Name	Comment	Response to Comment
10j	Robert Stewart, USDI, Office of Env. Policy, Denver	The terms "consistently" and "appropriate" must be defined.	These terms pertain to monitoring for permit compliance. Clarification has been added to Sections 2.4.2.5, 2.4.4.6, and 2.6, which describes the process of appropriate administrative action in the case of non-compliance. Appendix K includes direction from Section 16.21 in Forest Service Handbook 2209.13, Permit Violations.
10k	Robert Stewart, USDI, Office of Env. Policy, Denver	Monitoring data need to be consistent, repeatable, and statistically defensible.	Long-term trend monitoring follows Intermountain Region, Forest Service protocol (Forest Service Handbook 2209.21, Rangeland Ecosystem Analysis and Management Handbook).
10l	Robert Stewart, USDI, Office of Env. Policy, Denver	We suggest fencing and restoring the lower section of Saddle Creek.	An exclosure was constructed in lower Saddle Creek in summer 2003, fencing about 250 acres of riparian.
10m	Robert Stewart, USDI, Office of Env. Policy, Denver	The DEIS says that stock ponds create habitat for amphibians. This is usually not the case. However if there is documented reproduction in stock ponds on the allotment, this should be noted. These areas should be fenced.	The only site with boreal toad (Tin Cup Spring) has been fenced. Tiger salamanders are successfully reproducing in several ponds and do not appear to be impacted by grazing (Section 3.2.2).
10n	Robert Stewart, USDI, Office of Env. Policy, Denver	There appears to be a disproportionate amount of capable acres in the southern third. How will this affect range health when the same number grazes the northern portion (with fewer capable acres)?	Through annual monitoring and adjustments to the permit, use will be adjusted based on amount of available forage each year. Livestock numbers and/or season of use would be less in years that the southern unit was not grazed. In the future, pasture boundaries may be adjusted to divide the lower pasture or other means may be applied to more-evenly divide the production among pastures.
10o	Robert Stewart, USDI, Office of Env. Policy, Denver	It is unclear whether AUMs have been calculated by pasture or for the whole allotment.	A discussion of grazing capacity has been added to Section 3.4.6.

Letter Number	Name	Comment	Response to Comment
10p	Robert Stewart, USDI, Office of Env. Policy, Denver	The number of capable acres that will be fenced or receive treatments needs to be disclosed. These unavailable acres need to be considered when determining stocking rates.	The acres of capable rangelands to be treated in Alternatives B and D are included in Tables 2.1 and 2.2. Stocking rates will not vary significantly because of the relatively low production currently on these sites.
10q	Robert Stewart, USDI, Office of Env. Policy, Denver	All treated areas should have monitoring sites to document effects.	The following wording has been added to Chapter 2, Alternatives B and D, under the Vegetation Treatments heading. "Treated sites will be monitored prior to and after treatments to document the effects"
10r	Robert Stewart, USDI, Office of Env. Policy, Denver	Areas other than Tin Cup Spring should be improved if persistent boreal toad populations are desired.	Other areas are being protected with riparian fencing, as discussed in Section 4.2.9 and Appendix J. These areas include Mill Hollow, Jebo Canyon, Bubble Springs, and lower Saddle Creek.
11a	Roger Banner, USU Extension	Would like to see the major role that the lack of fire has played in creating the "unacceptable" state of sagebrush and aspen communities fully covered in the EIS. It sounds like it is all due to livestock grazing (both historical and current).	A discussion of the roles that fire suppression, timber harvest, and livestock use have played on the current conditions has been added to Chapter 4, Section 4.6.1.
11b	Roger Banner, USU Extension	Do not see a need to implement a rest rotation system and reduce permitted numbers by a third.	A discussion of grazing systems and stocking rate has been included in Section 4.6.3, Effects Analysis Methods and Assumptions.
11c	Roger Banner, USU Extension	A two pasture deferred rotation system (or switchback system) would work better and not require as much trailing and fence construction. Herding and water development would be used to distribute animals and achieve utilization objectives. Access to treatments could be controlled with temporary fences or other means.	An analysis of grazing systems (deferred, rest-rotation, and season long) has been added to Section 4.6.3 Effects Analysis Methods and Assumptions. Both Alternative B and D include riding and allow for development of additional water sources to improve distribution. Alternative D reduces the number of pastures (and pasture fences) and maintains livestock numbers at about 1260 head, and puts emphasis on water developments and riding to improve cattle distribution.

Letter Number	Name	Comment	Response to Comment
11d	Roger Banner, USU Extension	There does not appear to be a shortage of forage for permitted livestock. Utilization appears to be below established standards.	Livestock utilization monitoring information is included in Section 3.4.9.2 Seasonal Monitoring (Table 3.8), which shows that use has exceeded standards on several key area sites in the past.
11e	Roger Banner, USU Extension	Additional water development would go far toward improving livestock distribution, reducing site-specific cattle impacts and increasing the amount of suitable (capable) range.	Alternative D has been added. It puts an emphasis on water developments and riding to improve cattle distribution.
11f	Roger Banner, USU Extension	The FS and permittees must make a strong and effective noxious weed control effort (especially for spotted knapweed near the southern end of the allotment).	See response to comment 10g.
12a	Dick Carter	The DEIS offers vague evidence under the proposed action that over some undefined time frame conditions may improve toward forest plan PFC objectives. It simply fails to improve conditions and meet objectives in a timely and assured fashion.	The time frames for conditions to improve were identified in the Rangeland Health Environmental Impact Statement (USDA Forest Service 1996) and pertinent language has been include in Appendix I, Annual and Long Term Monitoring for the North Rich Allotment and referenced in Section 2.6, Annual Upland and Riparian Utilization and Use Monitoring and Upland/Watershed/Riparian Condition and Trend.
12b	Dick Carter	The DEIS should have analyzed the no-grazing alternative in conjunction with the proposed treatments and improvements.	See response to comment 4a.
12c	Dick Carter	What needs to be analyzed in the context of future changes to the travel plan and resource value effects in the area are the issues of noise, dust, and impacts to wildlife from more, and increased illegal, ATV use.	Unauthorized ATV use is acknowledged in the cumulative effects discussion in Appendix J and in Section 4.8.9 for wildlife. However, decisions regarding ATV use and travel planning are beyond the scope of this analysis.

Letter Number	Name	Comment	Response to Comment
12d	Dick Carter	The economic analysis is fraught with concerns. That grazing is a below cost endeavor and puts an economic burden on the FS is an important issue. The value of clean water, integral ecosystems, healthy wildlife populations, etc. was not given a valuation, making the analysis even weaker. Other values outside of grazing and beyond the effect to Rich County (landscape values) were not discussed.	See response to comment 4c.
12e	Dick Carter	With respect to boreal toads and BCT it is plainly noted that the history of grazing in this area has depleted these two species, once relatively wide ranging.	It is unlikely that grazing has reduced BCT numbers in North Rich. Most streams are intermittent and have never supported BCT. Cattle may have reduced boreal toad numbers as is noted in Section 4.2.3 of the FEIS.
13a	John Carter, Western Watersheds Project	DEIS failed to provide MPC emphasis in selection of alternatives by ignoring the ability of the allotment to support livestock in any sustainable manner.	A discussion on Management Prescription Categories (MPC) has been added to Section 1.3.2 of the FEIS.

Letter Number	Name	Comment	Response to Comment
13b	John Carter, Western Watersheds Project	DEIS failed to describe the importance of the allotment watersheds to surrounding communities (water delivery, timing, duration of flows)	Most research on water yield and timing is for activities that change the vegetation type on an area of land. Only one study was found that discussed the effects of grazing itself on water yields. Research on water yield as influenced by the degree of grazing in California winter grasslands (Liacos 1962) concluded that water yield is many times greater from grasslands under heavy grazing compared to grassland that has been protected from grazing. It is difficult to determine if the results of this study are applicable to the North Rich allotment since the study took place in a rainfall dominated area. Precipitation is dominated by snow in the North Rich area. However, many hydrologic processes would be similar in both areas. Trampling by livestock would cause lower soil infiltration rates and runoff would be expected to occur at a greater rate. Therefore, the indirect effects of livestock grazing in the North Rich area include a greater amount of runoff during snow melt because of lower infiltration rates. This likely occurs earlier in the spring since soil moisture storage would be lower. Late season flows may be reduced. **Continued**

Letter Number	Name	Comment	Response to Comment
13b	John Carter, Western Watersheds Project	DEIS failed to describe the importance of the allotment watersheds to surrounding communities (water delivery, timing, duration of flows)	**Continued** It is not expected that any measurable change in water delivery, timing, or duration of flows would occur to the surrounding communities as a result of the proposed action. Most of the North Rich area is expected to change slowly, with only a small portion of the riparian areas excluded from livestock grazing. For the no grazing alternative, reductions in water yield may occur because more soil storage would occur and transpiration by vegetation is likely. However, it is likely that the change would not be measurable at a watershed scale since the percentage of soil that is heavily trampled is very low within the entire watershed.
13c	John Carter, Western Watersheds Project	Ground cover standards are inadequate to maintain watershed functions.	The ground cover criteria were based on the 1995 Rangeland Health EIS (RHEIS), subsequently incorporated into the 2003 WCNF Revised Forest Plan (page 19 of the Record of Decision). The rationale is presented on page 6 of the Record of Decision. It states, "The 1995 Intermountain Region Supplement to Soil Management Handbook states that 'no more than a total of 15% of an activity area may have detrimentally disturbed soil'. Activity areas are defined as 'a land area impacted by a management activity, excluding specified transportation facilities, dedicated trails, and mining excavations and dumps. **Continued**

Letter Number	Name	Comment	Response to Comment
13c	John Carter, Western Watersheds Project	Ground cover standards are inadequate to maintain watershed functions.	**Continued** I have chosen a similar concept to apply to ground cover in order to maintain the qualities for which it benefits the soil resource. Effective ground cover will be at least 85 percent of the potential for each cover type." The 1995 REIS describes the methods for achieving Desired Future Conditions "Long-term monitoring methods (such as those defined by the Forest Service Rangeland Ecosystem Analysis and Management Handbook) are available to determine whether or not we are trending toward the DFC. Long-term trend can be characterized through monitoring changes over time in vegetation composition, ground cover, and streambank properties." Table 2-12 lists nested-frequency ground cover measurements as the method for monitoring long-term ground cover trend. The ground cover range at potential for tall forb vegetation type is 49-75% based on these long-term monitoring methods. Regarding the relationship between ground cover, erosion, and runoff, page 31.1-2 and 31.1-3 of the 1964 US Forest Service R-4 Range Handbook states that "During the past 15 years cover requirements have been studied on five watersheds in the Intermountain and Northern Rocky Mountain areas. ... On all five studies, it was concluded that at least a 60 to 70 percent ground cover (vegetation plus litter) was necessary to protect mountain slopes from excessive runoff and erosion from moderately high intensity summer storms".
13d	John Carter, Western Watersheds Project	DEIS failed to evaluate the importance of other uses (including wildlife-associated recreation) and its importance to the economy of local communities.	See response to comment 4c.

Letter Number	Name	Comment	Response to Comment
13e	John Carter, Western Watersheds Project	DEIS failed to address rangeland suitability of grazing in the allotment.	The issue of rangeland suitability was dismissed from this analysis (Section 1.6.3) because it is addressed at the Forest planning level in the revised Forest Plan.
13f	John Carter, Western Watersheds Project	Effective riding as a management tool has not been tried in the allotment.	Intensive riding is included in Alternatives B and D.
13g	John Carter, Western Watersheds Project	Greater reduction in livestock numbers must be included (to match the available forage).	See response to comment 3d.
13h	John Carter, Western Watersheds Project	Interested parties have no idea what the intent of the proposed action is.	For clarity, the word "likely" was removed in the FEIS (Section 2.4.2.2). Under Alternative B, livestock numbers would be reduced by one third. Numbers and/or season of use may be adjusted following three years of monitoring of actual use and distribution of livestock within the allotment.
13l	John Carter, Western Watersheds Project	Calculation of AUMs is inappropriate.	A more-detailed analysis and discussion of grazing capacity was added to Section 3.4.6.
13j	John Carter, Western Watersheds Project	Proposed Action does not include protection of treated areas.	Treated areas will be protected as stated in Section 2.4.2.5 and Section 2.4.4.6. As needed, this will be accomplished through fencing and intensive herding.
13k	John Carter, Western Watersheds Project	Livestock use suppresses aspen regeneration and depletes grasses and palatable forbs.	As noted on Section 4.6.9.1, evidence from the Edgar Fire that occurred in 1994 showed that, even with continued grazing in the North Rich Allotment aspen was able to successfully regenerate following fire.

Letter Number	Name	Comment	Response to Comment
131	John Carter, Western Watersheds Project	Utilization levels are inappropriate for goshawk and maintaining mycorrhizal fungi function in their home range.	The Decision Notice for the Utah Northern Goshawk Project Environmental Assessment (USDA Forest Service 1999) identified that "Changes to current grazing permits would occur in those landscapes where grazing can be attributed as causing a deterioration in goshawk habitat." Guideline 27 of the Environmental Assessment (which applied only to Alternative D and only in forested communities, and was not included in the decision) is as follows: Guideline-27: Wildlife and livestock utilization of grasses and forbs should average 20% by weight, and not exceed 40% by weight, in any forested group within a pasture or allotment. Shrub utilization should average 40% by weight, and not exceed 60%, in any forested group within a pasture or allotment. This level of utilization should maintain adequate seed, mast, and foliage needed to support goshawk prey species. Variance from these utilization ranges may occur when it can be shown that utilization levels in combination with grazing system being applied, season of use, and the health trend of the vegetative community, will restore or maintain the desired production of seed, mast and foliage identified through the landscape assessment. This guideline does not apply to non-forest patches. The forage utilization rate on this allotment would be 35 percent on unsatisfactory rangelands, which is within the allowed use levels described above. Doerr and others (1984) found that mycorrhizal grasses and perennial forbs were more successful on soils with minimal disturbance. They also found that nonmycorrhizal annuals were more successful on highly disturbed plots. The effects, however, of livestock utilization on mycorrhizal fungi was not found in a literature search.

Letter Number	Name	Comment	Response to Comment
13m	John Carter, Western Watersheds Project	Livestock utilization on uplands should be measured during the grazing period, rather than at the end of the season. No frequency of monitoring is specified.	A clarification of "annual" monitoring has been added in Section 3.4.9 and Appendix I. Utilization monitoring is conducted throughout the grazing season to determine the appropriate time for livestock to move from one area to another, not just at the end of the grazing season.
13n	John Carter, Western Watersheds Project	Riparian utilization standards are inappropriate and bank trampling must be monitored.	As noted in Section 2.6, monitoring methods will include Pfankuch stream stability rating and photo points inside and outside of fenced riparian areas.
13o	John Carter, Western Watersheds Project	Forage capacity and forage use should be assessed to determine stocking rates.	A more-detailed discussion of grazing capacity is included in Section 3.4.6.
13p	John Carter, Western Watersheds Project	Upland trend and utilization monitoring locations should be established in consultation with interested parties in each rangeland cover type, in each pasture, and in exclosures.	As noted in Section 3.4.9 upland trend monitoring sites have been added to include a broader distribution and an inclusion of the aspen cover type. Riparian inventory sites have already been included in the Hells Hollow/Saddle Creek exclosure and will also be added to the Mill Hollow exclosure once it is completed.
13q	John Carter, Western Watersheds Project	Water quality monitoring should include fecal coliform bacteria monitoring in each pasture while livestock are present to show that the Forest Service is complying with anti-degradation and narrative standards and to show that BMPs actually work.	The EIS (Section 3.8.5) presents bacteria data collected according to State of Utah water quality protocols for a grazing allotment near the North Rich allotment. We feel this data is applicable to represent bacterial conditions on the North Rich Allotment.
13r	John Carter, Western Watersheds Project	Monitoring locations should be mapped and an annual summary of monitoring data should be provided to interested parties. Interested parties should be invited to planning meetings to establish management and Annual Operating Instructions.	Locations of long-term trend sites and existing data are available in the project file.

Letter Number	Name	Comment	Response to Comment
13s	John Carter, Western Watersheds Project	Livestock use has major effects on streamflows in the watersheds and that influence must be analyzed.	See response to comment 13b.
13t	John Carter, Western Watersheds Project	Livestock trampling, grazing, and alteration of plant communities and soils have major effects on Cheney Creek, Richardson Creek, South Sinks, Saddle Creek, Jebo Creek, Tufts Creek and their tributaries, which should support Bonneville cutthroat trout. The occurrence of Bonneville cutthroat trout in the Hells Hollow exclosure is testimony to their need for protection from livestock grazing.	As discussed in Section 3.2.2, it is unlikely that grazing has reduced Bonneville cutthroat trout numbers in these streams in the North Rich Allotment. These streams have never supported Bonneville cutthroat trout.
13u	John Carter, Western Watersheds Project	The DEIS should analyze the effects to spotted frogs.	As added to Section 3.2.3, spotted frogs are not found in either Rich or Cache counties and will not be affected by activities conducted within the North Rich Allotment.
13v	John Carter, Western Watersheds Project	The role of livestock grazing on heritage resources in all water developments and water resources should be analyzed.	Cultural resource surveys have been conducted within the North Rich Allotment and consultation with interested tribal parties and the State Historic Preservation Office has been conducted. See Section 3.3.2.
13w	John Carter, Western Watersheds Project	Based on current conditions, permitted livestock numbers should be reduced more than by 1/3 because of evidence described in the 1968 USFS report.	See response to comment 13g.

Letter Number	Name	Comment	Response to Comment
13x	John Carter, Western Watersheds Project	No documentation is included in the DEIS regarding actions taken against permits based on failures to maintain existing fences.	A history of fence construction and problems with maintenance has been added to Section 3.4.3. A 25% reduction was taken in 1994 as reflected in the season of use being reduced from 105 days to 80 days (Section 3.4.3 and Appendix C). Section 2.6, Monitoring, describes the specific steps that will be taken in these situations. In addition, Appendix K has been added, which includes direction from Section 16.21 in Forest Service Handbook 2209.13, Permit Violations.
13y	John Carter, Western Watersheds Project	The DEIS does not evaluate the aesthetic values and wildlife-associated recreation (including wildlife watching, fishing, and hunting) values forgone because of livestock grazing.	As added in Appendix H of the FEIS, based on the constraints of federal laws and regulation toward affecting the financial efficiency of the Forest Service grazing program, together with Congressional direction to authorize grazing in accordance with NEPA, financial efficiency as a condition for grazing authorization is considered outside the scope of Forest Service grazing projects.
13z	John Carter, Western Watersheds Project	The DEIS fails to analyze the socioeconomics associated with Cache County.	The area of influence for the analysis of socioeconomic effects is Rich County because it is the county in closest proximity to the allotment and is the local economy on which the North Rich Allotment has primary influence, as described in Section 3.6.
13aa	John Carter, Western Watersheds Project	The DEIS fails to analyze the economic costs of fence construction, vegetation treatments, and other activities associated with livestock grazing.	The costs associated with range improvements are included in Section 4.5.

Letter Number	Name	Comment	Response to Comment
13bb	John Carter, Western Watersheds Project	The economic analysis should consider information from the State of Utah Governor's Office website and Souder (1997). It is the Forest Service's duty to perform an analysis of alternatives that addresses economics, the values of all resources, and the loss in these values for each AUM consumed by livestock.	According to FSH 1909.15, Washington Office Amendment 1909.15-93-1, 65.1, Exhibit 01, Page 22 of 25, Cost Benefit Analysis, a cost-benefit analysis is not required. It states, in part, "For purposes of complying with the Act (NEPA), the weighing of the merits and drawbacks of various alternatives need not be displayed in a monetary cost-benefit analysis and should not be when there are important qualitative considerations. In any event, an environmental impact statement should at least indicate those considerations, including factors not related to environmental quality which are likely to be relevant and important to a decision." The issues and indicators (factors) relevant to this decision are addressed in Chapter 1, Section 1.6.2 and Chapter 4, Environmental Effects.
13cc	John Carter, Western Watersheds Project	The DEIS fails to determine current production of palatable forbs and grasses, ground cover, plant composition of plant communities on the allotment.	Section 3.4.6, has been added that discusses estimates of forage production for the allotment and for each pasture proposed in Alternative B.
13dd	John Carter, Western Watersheds Project	Some Willow Creek Ecology monitoring sites were misplaced in Chapter 3.	We apologize for the misplacement. The discussion of Willow Creek Ecology's findings, however, remains accurate.
13ee	John Carter, Western Watersheds Project	More sites are needed to assess rangeland conditions and these sites should be mapped so they can be visited by third parties.	See response to comment 10a. Locations of inventory sites are mapped and available in the project file.

Letter Number	Name	Comment	Response to Comment
13ff	John Carter, Western Watersheds Project	The DEIS should address the effects of livestock grazing on aspen regeneration.	A discussion of the effects of livestock on aspen regeneration has been added to Chapter 4, Sections 4.6.1, 4.6.3, and 4.6.9.1. In addition, a discussion of the effects livestock grazing has had on aspen regeneration following fire in the North Rich Allotment is included in Sections 3.7.2 Existing Conditions, Aspen Cover Types.
13gg	John Carter, Western Watersheds Project	Site-specific data and analyses should be done related to soil conditions. The Forest Service must map soils, describe their condition, and model erosion rates using RUSLE or a suitable calculation.	Soil maps are available in the project file. Section 3.8.3 describes current soil conditions. CEQ regulations do not require the quantitative assessment of effects that erosion modeling by a program such as RUSLE would provide. Because of the large variability in model factors such as ground cover, slope, and slope length, and the distribution of grazing throughout the allotment, we felt that site-specific erosion modeling would be misleading. We chose instead to disclose the effects to soil resources using a qualitative approach. Various studies were used as references (see Chapter 7) to analyze effects on soil resources from different alternatives and treatments.
13hh	John Carter, Western Watersheds Project	Water resources, altered hydrology, wetland destruction (through water developments) have not been assessed and their loses counted. The Forest should apply RUSLE and other methods to calculate changes.	Water resources within the analysis area are described in the affected environment in Sections 3.8.4 through 3.8.7and assessed in the direct and indirect, and cumulative effects Sections 4.7.4 through 4.7.9. For altered hydrology see response to comment 13b. Regarding the use of RUSLE or other models see response to comment 13gg.
13ii	John Carter, Western Watersheds Project	The Forest incorrectly analyzed the relationship of cattle to fecal coliform in Spawn Creek and its tributaries.	The Forest Service sampled bacteria according to State protocols and based our conclusions upon this information, as discussed in Section 3.8.5.

Letter Number	Name	Comment	Response to Comment
13jj	John Carter, Western Watersheds Project	The Forest has not adequately addressed the effects of livestock grazing and the subsequent sedimentation, soil compaction and deleted vegetation to the depletion of ground water and late season flows.	See response to comment 13b.
13kk	John Carter, Western Watersheds Project	The DEIS does not analyze the effects on wildlife behavior modification related to finding food and cover and to displacement.	For some species the effect of reduced cover and/or reduced food is a reduction in population density, which is a behavior response. The effects to wildlife are discussed in Section 4.8.
13ll	John Carter, Western Watersheds Project	The DEIS must include measures that allow for wolves as they are likely to establish in the area.	A discussion of wolves, as related to the grazing effects on prey species on which wolves depend (e.g. deer, elk, moose, snowshoe hare), is included in Section 4.8. Information in Section 3.9.2 discusses the current status of the wolf.
13mm	John Carter, Western Watersheds Project	Management Indicator Species are inadequately addressed.	MIS are addressed in Sections 3.9.2.2 and 4.8.4.3. In addition, management indicator communities have been discussed in Sections 3.7.2 as well as under 4.6.4 (Vegetation Direct and Indirect Effects).
13nn	John Carter, Western Watersheds Project	We incorporate the comments on this DEIS by Bruce Pendry, and our joint appeal of the WCNF Forest Plan.	Thank you for your comment.
13oo	John Carter, Western Watersheds Project	Need an additional alternative with no fences, constant riding, and greatly reduced stocking rate.	Alternative D has fewer fences and greater use of riders to distribute livestock. See response to comment 13w.
13pp	John Carter, Western Watersheds Project	Stocking the allotment at any level without data to show available forage is unreliable and risky.	See response to comment 13cc.

Letter Number	Name	Comment	Response to Comment
13qq	John Carter, Western Watersheds Project	DEIS does not address the role of livestock grazing in creating conditions that lead to catastrophic fire and the disruption of micorrhizal fungi and nutrient cycling.	See response to comment 13l. In addition, The role of fire has been added to the discussion of each alternative in Chapter 4, Effects on Vegetation. It is not clear that livestock grazing has created conditions leading to catastrophic fire on the allotment. The possible effect has, however, been a reduction in fuels in heavily impacted areas and a consequent reduction in fire occurrences and intensity because of the lower available fuels.
13rr	John Carter, Western Watersheds Project	DEIS does not analyze the impacts of water developments to nearby habitats.	The effects of livestock grazing near water developments has been added to the discussion of each alternative in Chapter 4, Effects on Vegetation.
13ss	John Carter, Western Watersheds Project	DEIS does not address the sustainability of continued livestock grazing.	The FEIS includes information on production (Table 3.3), which was not included in the DEIS. Based on this information, forage is available to sustain continued livestock grazing. Final numbers will be based on actual use and distribution of livestock on the allotment.
13tt	John Carter, Western Watersheds Project	DEIS does not address the effects of livestock grazing on the conversion of aspen to conifer and the resulting change in water balance to watersheds in the allotment.	Additional discussion has been added to Chapter 3, Vegetation on the effects of livestock grazing on the conversion of aspen to conifer and to Chapter 3. Hibbert (1979) noted that average values of evapotransporation for aspen and mixed conifer are about equal. No change in water yield is expected from this conversion of aspen to conifer or visa versa. DeByle (1985) noted that that the change in water yield as a result of conversion from conifer to aspen has "not been tested adequately" and that it should not be recommended as a management tool.
13uu	John Carter, Western Watersheds Project	Only acceptable alternative is the No Grazing Alternative.	Thank you for your comment.

Letter Number	Name	Comment	Response to Comment
14c	Paul Lamborn, North Rich Grazing Assn	Despite the drought conditions we feel the range is in very good shape. Forage is underutilized in some areas. Some areas are utilized more than the FP standard, but overall most has been taken good care of. The allotment can sustain the current numbers and maybe even more in the future.	As noted in Section 3.4.5, current conditions have been determined for approximately half of the capable rangelands within the allotment. Over 40 percent of the allotment is in unsatisfactory condition. F is discussed in Section 3.4.6.
14d	Paul Lamborn, North Rich Grazing Assn	We have concern with the fences that need to be built for the 3-pasture rest-rotation system. It would cost the permittees $28,000 in labor that could be spent on water development.	The number of pastures and miles of fence were reduced in Alternative D as noted in Section 2.4.4.
14e	Paul Lamborn, North Rich Grazing Assn	An alternative to permanent fencing would be temporary, electric fencing and increasing the number of riders and hours riding.	Alternative D has been added to the FEIS.
15a	Craig Axford, Utah Environmental Congress	Regarding a new alternative for additional water development, UEC takes the position that in the absence of proper maintenance of existing water developments, we cannot expect proper maintenance of additional developments in the future.	Thank you for your comment.
15b	Craig Axford, Utah Environmental Congress	Any alternative that would further dewater springs or streams must be considered in light of boreal toad, BCT, and other riparian resources.	Any development that would dewater springs or streams would require additional analysis under NEPA.
15c	Craig Axford, Utah Environmental Congress	Ladders and other escape devices that enable birds and other wildlife using troughs to escape drowning should be installed on existing and future water developments.	It is a common practice to prevent accidental drowning of wildlife species (e.g. small mammals and small-medium sized birds) by installation of escape devices. This prevents the loss of wildlife and assists with maintaining water quality. All troughs will have escape devices installed.
16a	Stu Wamsley	The cost of the proposed fence construction would be a serious burden on the permittees. The money could be better spent on water developments, which would allow for better distribution of cows and more effective utilization of the range.	Alternative D has been added to the FEIS.

Letter Number	Name	Comment	Response to Comment
16b	Stu Wamsley	Our livelihood hangs in the balance of this decision.	See response to comment 8a.
17a	Tom Weston	The allotment looked in good shape this year. 75% of my cattle are off and they look good, which is an indication of plenty of feed this year. My ranching operation could not stand a cut of 30% of numbers.	See response to comment 8a.
18a	Ron Younger	I suggest the issues be expanded to include biodiversity, the role of microbiotic crusts, aquatic macroinvertebrates and benefit-costs.	A discussion on microbiotic crusts has been added to Section 3.7.2. A discussion of aquatic invertebrates is included in Sections 3.2.4, 4.2, and Appendix F. As noted, Cheney Creek and Saddle Creek have been sampled for aquatic invertebrates. See response to comment 13bb for a discussion on benefit-cost analysis.
18b	Ron Younger	The assumption that a three-pasture rotation will improve ground cover is questionable. The literature cited was based on a five-pasture rotation.	Section 4.6.3 includes a review of literature, including Watts and others (1987) who noted improvements to ground cover in a 3-pasture rest-rotation study.
18c	Ron Younger	An alternative that includes a five-pasture rotation with 600 head, using riparian and pasture fences, utilization standards and monitoring should be addressed.	See response to 5a.
18d	Ron Younger	Additions to the Glossary section should include stubble height, greenline, utilization standards, and ground cover standards.	These terms have been added to the Glossary.
19a	Jim Catlin, Wild Utah Project	Key information is missing from the DEIS; allotment monitoring is summarized but not available in data form; spatial data is not provided for ecological indicators needed to determine range condition and range health and plant community structure/composition.	Data and maps are available in the project record.
19b	Jim Catlin, Wild Utah Project	The DEIS gives no explanation on how stocking level, grazing season, and rest-rotation were developed; the analysis should include range productivity and soils analysis and capacity determinations.	A more-detailed discussion of grazing capacity was added to Section 3.4.6.

Letter Number	Name	Comment	Response to Comment
19c	Jim Catlin, Wild Utah Project	The DEIS is unclear on steps that must be taken for lynx recovery; a pending appeal of the Revised Forest Plan addresses this very topic.	See response to comment 6a for a discussion on lynx. The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process.
20a	Chubb Munns	Reduced number of cattle permitted to graze will reduce income.	See response to comment 8a.
20b	Chubb Munns	Concerned that EIS was conducted during a drought.	Although the environmental analysis has been conducted during the last few years (since 1999, when the scoping letter was distributed), data from as early as the 1950s has been included in the analysis. Pre-drought data is included in the EIS as well as data from more recent droughty years. See Section 3.4.9.1.
20c	Chubb Munns	Recreational impacts (ATV) to environment.	Unauthorized OHV use has been addressed in the cumulative effects sections of Chapter 4.
20e	Chubb Munns	Consider staying with 1260 head of cattle and increasing herding.	Alternative D has been added to the FEIS.
20f	Chubb Munns	Need to spend money of water development, electric fencing and seeding, not on pasture fences.	Alternative D has been added to the FEIS.

Letter Number	Name	Comment	Response to Comment
21a	Craig Axford, Utah Environmental Congress	UEC feels the research included in "Countering Misinformation Concerning Big Sagebrush" (RMRS-RP-40, July 2003) may be of use in the North Rich analysis.	An e-mail memo (in the project file) was sent to the Intermountain Region Ecologist from Jack B. Waide, Assistant Station Director - Research Rocky Mountain Research Station on November 17, 2003 related to this document. A cover letter from Rocky Mountain Research Station Director, Marcia Patton-Mallory (in the project file) noted that "Publication of this report has generated a great deal of interest about the present state of science regarding big sagebrush and its relation to fire, grazing, and wildlife habitat. In addition, concerns have been expressed about some of the interpretation and analyses contained in the paper and the language in which they are expressed." She went on to state that "In response to the interest and debate expressed related to the initial paper and in recognition of the considerable uncertainty that remains in the scientific literature regarding the larger science issues about big sagebrush, we invite interested scientists to help us better present a diversity of views on this topic." "We will include alternative perspectives on the “axioms” contained in the paper by Welch and Criddle, and also seek to achieve a level of synthesis and consensus as to the present scientific understanding, what areas of uncertainty and disagreement remain, and what research is needed to help resolve these uncertainties." At this time the Forest feels it is best to view the 8 axioms addressed in this publication as inconclusive and cannot comment on their relevance at this time.

Letter Number	Name	Comment	Response to Comment
22a	Bruce Pendry	The requirement for full range of reasonable alternatives (NEPA, CEQ, FS Manual and Handbook) has not been met. DEIS considered three alternatives with only one (Alt B) being available for implementation.	The FEIS includes four alternatives, all of which are considered for implementation.
22b	Bruce Pendry	The preferred alternative would take too long to implement (2 miles of fence per year) so other means, such as full time herding or shock collars would be more appropriate.	Full time herding is included in Alternatives B and D.
22c	Bruce Pendry	Vague and conditional statements in Alternative B should be replaced with definite, measurable, and enforceable terms. It is important to build a "fail safe" alternative because the preferred alternative has been tried before and it did not work.	Direction for annual and long-term trend monitoring, which includes "Variation Which Would Cause Further Evaluation and/or Change in Management Direction" has been included in Appendix I.
22d	Bruce Pendry	The allotment cannot produce enough forage to be grazed on a sustained yield basis.	A discussion of grazing capacity was added to Section 3.4.6.
22e	Bruce Pendry	Only about 10,355 acres of the 27,000-acre allotment are capable and 77 percent of these acres are in unsatisfactory condition because of livestock grazing.	Capable rangeland acres were recalculated for the FEIS and determined to be over 16,000 acres (Section 3.4.4) and condition of these rangelands has also been updated and is included in Section 3.4.5.
22f	Bruce Pendry	The Forest should calculate the grazing capacity (stocking rate) of the allotment based on the unsatisfactory condition of the land and the north-south ecological corridor.	See response to comment 22d.
22g	Bruce Pendry	The Forest should give priority to restoration and maintenance of the north-south ecological corridor that includes the allotment.	The Forest has given priority to restoration and maintenance of the north-south ecological corridor. The Biodiversity/Viability Desired Future Condition for the Bear Management Area, incorporated into the North Rich EIS is as follows: "Restoration and/or maintenance of a healthy and sustainable, broad scale, north-south wildlife corridor within this management area will be a priority in all management decisions" (see Section 1.5.8).

Letter Number	Name	Comment	Response to Comment
22h	Bruce Pendry	The Forest should create an alternative that maintains and restores the north-south ecological corridor to make it consistent with Forest Plan direction.	A range of alternatives is provided that addresses understory vegetative conditions and protection and restoration of the north-south wildlife corridor (See Sections 4.6 and 4.8).
22i	Bruce Pendry	DEIS fails to analyze the effects of the alternatives on the north-south corridor, but rather concentrates on effects to certain species.	As stated in Section 3.9.2, "In most instances livestock grazing will not change the dominant overstory cover type..." The differences in alternatives are primarily related to differences in understory vegetation conditions, described in Section 4.6. The north-south corridor is important for species movement between forested habitats, with emphasis on species that prefer large blocks of forested habitat (i.e., the lynx and wolverine). The EIS addresses effects of livestock grazing on these species, the species on which they depend (their prey species), and their preferred habitats. Thus, the effects to the corridor are addressed in the analysis of potential effects to vegetation and wildlife species as discussed in Sections 4.6 and 4.8.
22j	Bruce Pendry	Area of influence for direct and indirect effects to wildlife is an irrational constraint on the scope of analysis given the regionally significant ecological corridor.	Direct and indirect effects of livestock grazing on wildlife occur within the North Rich Allotment, which comprises a very small portion of the larger north-south wildlife corridor (See Section 3.9.1). The effects to those species that potentially depend on the connectivity between large forested patches within the corridor (such as the lynx and wolverine) are discussed in Section 4.8. Additional information regarding the lynx and the wildlife corridor is included in Section 4.8.4.4.
22k	Bruce Pendry	A biological assessment must be completed and consultation on effects to Canada lynx must be conducted.	A biological assessment and consultation with the USFWS will be completed before a decision is made.

Letter Number	Name	Comment	Response to Comment
22l	Bruce Pendry	Requirements relative to lynx conservation are more expansive than acknowledged in the DEIS.	See responses to comments 6a and 22k.
22m	Bruce Pendry	Additional specific provisions in the Lynx Conservation Assessment and Strategy (LCAS) relative to the needs of lynx must be included in the analysis.	See responses to comments 6a and 22k.
22n	Bruce Pendry	The Forest must afford the lynx special management attention wherever the lynx may be present; not just in lynx analysis units (LAUs)	See responses to comments 6a and 22k.
22o	Bruce Pendry	FEIS should make provisions for how management activities on the allotment will be modified if the population status of management indicator species (MIS) changes.	36CFR219.19 states that population trends of MIS will be monitored and relationships to habitat changes determined. This monitoring and evaluation at the planning area (National Forest) level becomes the context for project level effects analysis. Other than "maintain viable populations", there is no requirement that management activities be modified if population status of MIS changes.
22p	Bruce Pendry	Socio-economic analysis cannot be drawn so narrowly and should include effects to Cache County, or areas critically interested in and affected by livestock grazing in the allotment. Do Rich County permittees have impacts on the Cache County economics?	See response to comment 13z.

Letter Number	Name	Comment	Response to Comment
22q	Bruce Pendry	The Forest should not claim that unless permittees have access to grazing on National Forest Lands they cannot remain in business and must subdivide their land, unless they have information that supports this claim. The lack of land use planning in Rich County may be more important reason for subdivision of private lands than access to public lands.	Section 3.6.2.3, noted that subdivision is one option that permittees could and have considered. The document does not indicate it is the driving factor in the decision whether or not to continue grazing.
22r	Bruce Pendry	A full and complete examination and presentation of economic effects of livestock grazing on public lands is lacking. This should include not only the revenues generated from livestock grazing, but should also include values otherwise forgone by focusing resources on livestock grazing rather than other resources. The full costs of livestock grazing are not presented and considered.	See response to comment 4c.
22s	Bruce Pendry	The FEIS needs to provide more explanation and analysis for describing how the implementation of the preferred alternative will not have unavoidable adverse or irreversible/irretrievable commitments or long-term effects to various resources.	Reasons for the assertions made in each of the resource sections have been added in Chapter 4, Environmental Effects.
22t	Bruce Pendry	The area for cumulative effects for each resource needs to be revisited. For many of the resources, the area influenced by those resources and the area influencing those resources is much broader than the North Rich Allotment.	Clarification of cumulative effects and the area of influence have been added to Chapter 4, Environmental Effects.

Letter Number	Name	Comment	Response to Comment
23a	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	This group's appeal of the Revised Forest Plan identifies shortcomings "also apparent in, and being perpetuated by, the North Rich EIS since this site specific project is guided by and subject to the revised forest plan." W-C Forest Plan must be modified as demanded in the appeal prior to it serving as a legally sufficient basis for analysis and approval of the North Rich EIS and associated Allotment Management Plan.	The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process.
23b	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	The Lynx Conservation Assessment and Strategy and Lynx Analysis Units have not been subjected to compliance with NEPA and NFMA. Public participation requirements and consultation with USFWS regarding lynx for the Forest Plan or the North Rich Allotment Management Plan is inadequate.	See responses to comments 6a and 22k.
23c	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	Species at risk present on NRA do not receive species-specific protections needed to ensure their viability under the revised forest plan thus making it legally insufficient guidance for the NRA EIS and ROD.	Relevant species at risk, conservation measures, and effects are addressed in the FEIS in Sections 3.9.2 4.8.4.4, and 4.8.4.5, and in Appendix F. The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process.

Letter Number	Name	Comment	Response to Comment
23d	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	Revised Forest Plan identifies no MIS for sagebrush habitats, which are affected by grazing and in unsatisfactory condition in NRA making North Rich EIS an inadequate analysis document. Tall Forb and mountain brush habitats also occur in NRA and have no MIS identified in the Revised Forest Plan.	The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process. The status of and effects on sagebrush, tall forb and mountain brush habitats are addressed in the FEIS, Section 4.6.
23e	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	FEIS for Revised Forest Plan failed to determine capability and suitability of habitat for MIS, condition and trend with respect to MIS, and to make needed adjustments in livestock grazing.	The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process.
23f	Bruce Pendery on behalf of Western Watersheds Project, Wild Utah Project, Bridgerland Audubon Society, Bear River Watershed Council	North Rich EIS includes mention of the Shoshone off-highway vehicle trail, which the Forest Plan appeal states is proposed without compliance with NEPA.	The question of Revised Forest Plan sufficiency is being addressed through the 36CFR217 administrative appeal process.

Letter Number	Name	Comment	Response to Comment
24a	EPA, Region 8, Denver	Suggest an alternative that allows livestock grazing on upland/non-sensitive areas and prohibits grazing on sensitive areas.	Fencing sensitive riparian areas is included in Alternatives B and D. Without fencing sensitive areas, managing livestock to graze some areas while not grazing others is a difficult task.
24b	EPA, Region 8, Denver	Suggest more riparian fencing in future and developing off-channel water sources for livestock.	More riparian fencing and off-channel watering may be constructed in the future, following additional nepa analyses.
24c	EPA, Region 8, Denver	Recommend fencing Tin Cup Spring and protect stock ponds that hold Boreal Toad populations, regardless of the alternative selected.	Tin Cup Spring was fenced in 2003. No Boreal toads have been found to utilize any other ponds within the North Rich Allotment (Section 3.2.3).
24d	EPA, Region 8, Denver	Suggest more maps, photos, and graphs clearly depicting the current conditions on the allotment.	Figure 3.4 has been added to illustrate known rangeland conditions across the allotment.
24e	EPA, Region 8, Denver	Provide the proposed schedule of completing riparian area fencing in the FEIS.	Riparian fencing included in the Record of Decision will be completed within 5 years (see Section 2.4.2.4). Other riparian fencing projects will need additional nepa analyses and will be completed as funding becomes available.
24f	EPA, Region 8, Denver	Indicate if standards for fecal coliform and total bacteria (page 3-55) are for drinking water or for aquatic life.	The standards are for recreation and aesthetics, (beneficial use classification 2B). There are no bacterial standards for cold-water aquatic life (beneficial use classification 3A). The beneficial use classification for these waters do not include drinking water (beneficial use classification 1C). This information has been added to the FEIS in Section 3.8.5 Water Quality.
24g	EPA, Region 8, Denver	Include further discussion on aspen succession and why treatments are needed.	Additional discussion has been added to Chapter 3 on the lack of current age class diversity and composition of aspen communities within the Bear River Range portion of the Forest. An analysis of aspen within this portion of the Forest identified stands within the North Rich Allotment for treatments to improve age class diversity.

Letter Number	Name	Comment	Response to Comment
24h	EPA, Region 8, Denver	Discuss how grazing affects forest stand composition, fire fuels, and fire suppression.	In addition to the discussions in Section 3.7, Vegetation, on age class diversity and composition of aspen communities in the North Rich Allotment, further information has been added on the consequences of these on fire fuels and fire suppression. Section 4.6.1, Introduction also includes additional information on the roles that fire suppression, fire, timber harvest, and livestock use have played in species composition and fuels.
24i	EPA, Region 8, Denver	Clarify how noxious weeds will be controlled, eradicated, and prevented from spreading; consider biological control for spotted knapweed.	See response to comment 10g.
24j	EPA, Region 8, Denver	Address the need for greater monitoring, enforcement, and education to reduce illegal ATV use and the resource damage it causes.	While unauthorized ATV use is evaluated under cumulative effects, decisions regarding ATV use are beyond the scope of this analysis.
24k	EPA, Region 8, Denver	The socioeconomic impacts to recreation are not quantified. Recreation demand, use, and value information would be helpful to compare to other uses for the allotment.	See responses to comments 4c and 13bb.
24l	EPA, Region 8, Denver	The reader has no way to evaluate the relative values of fish and wildlife protection as compared to livestock grazing.	It is very difficult to assess a dollar value to a particular species. The analysis displays the differences between alternatives qualitatively. See response to comment 13bb.
24m	EPA, Region 8, Denver	Explain grazing fees in the document. Further explanation of benefits to the community would be helpful.	Grazing fees for permitted livestock use on National Forest Systems lands are designated by Congress in accordance direction incorporated in FLPMA, Sect. 401, and 36 CFR 222.10(a). This information has been added in Appendix H.

Letter Number	Name	Comment	Response to Comment
24n	EPA, Region 8, Denver	It is difficult to evaluate the difference in effects to wildlife between alternatives B and C in Chapter 4. It would be helpful to quantify differences or better explain relative differences.	As stated in Section 3.9.2, "In most instances livestock grazing will not change the dominant overstory cover type..." Most models address conditions regarding overstory conditions, not specific understory habitats; thus the scale for modeling is usually too broad for modeling species numbers. The differences between alternatives have been displayed qualitatively. It is difficult to model understory vegetation conditions/changes and link these to changes in abundance of specific species without making major assumptions.
24o	EPA, Region 8, Denver	The FEIS should address how management actions will track unforeseen adverse environmental impacts; it should include indicators that can be used as measures of success or trigger new management direction.	Appendix I has been added, which includes annual and long-term trend monitoring and "Variation Which Would Cause Further Evaluation and/or Change in Management Direction"

GLOSSARY

Sources for this glossary include: Forest Ecosystem Management: An Ecological, Economic, and Social Assessment; Report of the Forest Ecosystem Management Assessment Team (FEMAT); 1993; Region 4 Revision Desk Guide; Resource Planning Act Program Glossary 1995; and U.S.D.A. Forest Service Manual & Handbook, Executive Order 11987 (Exotic Organisms); USDA Forest Service, People's Glossary of Ecosystem Management Terms (http://www.fs.fed.us/land/emterms.html)

active nest
In regards to goshawk habitat, a goshawk nest known to have contained an egg. A nest need not have successfully produced fledglings (Utah Northern Goshawk Project Environmental Assessment, October 1999).

activity area
A land area impacted by a management activity, excluding specified transportation facilities, dedicated trails, and mining excavations and dumps. Activity areas include harvest units within timber sales, prescibed burn areas, and grazing areas within allotments. Riparian and other environmentally sensitive areas may be monitored and evaluated as individual activity areas within larger management areas.

adaptive management
A type of natural resource management in which decisions are made as part of an on-going process. Adaptive management involves testing, monitoring, evaluation, and incorporating new knowledge into management approaches based on scientific findings and the needs of society.

age class
An interval into which the age of species is divided for classification. An age grouping of trees according to an interval of years, usually 20 years. A single age class would have trees that are within 20 years of the same age, such as 1-20 years or 21-40 years.

allotment (grazing)
Area designated for the use of a certain number and kind of livestock for a prescribed period of time.

Allotment Management Plan (AMP)
A document prepared in consultation with the permittees(s) involved that specifies the program of action for implementation of the forest plan as related to livestock grazing activities. Each allotment on National Forest System lands is required to have an Allotment Management Plan. Each plan must be reviewed and updated every 10 years or if conditions deem necessary, whichever comes first.

allowable use
The degree of use estimated to be proper until proper use is known. A baseline utilization percentage established in a Forest Plan.

alternative
In an Environmental Impact Statement (EIS), one of a number of possible options for responding to the purpose and need for action.

animal unit
Considered to be one mature cow of approximately 1,000 pounds, either dry or with calf up to six months of age, or their equivalent, based on a standardized amount of forage consumed (26 lbs/day).

Animal Unit Month (AUM)
The amount of feed or forage required by an animal unit for one month.

annual maintenance
Work performed to maintain serviceability, or repair failures during the year in which they occur. Includes preventive and/or cyclic maintenance performed in the year in which it is scheduled to occur. Unscheduled or catastrophic failures of components or assets may need to be repaired as a part of annual maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

aquatic ecosystem
40 CFR 230.3 - Waters of the United States that serve as habitat for interrelated and interacting communities and populations of plants and animals. FSM 2526.05 - The stream channel, lake or estuary bed, water, biotic communities and the habitat features that occur therein.

AUM
See Animal Unit Month.

bark beetle
An insect that bores through the bark of forest trees to eat the inner bark and lay its eggs. Bark beetles are important killers of forest trees.

big game
Large mammals, such as deer, elk, and antelope that are hunted for sport.

biological diversity (or biodiversity)
The variety and abundance of life and it's processes. It includes all living organisms, the genetic differences among them, and the communities and ecosystems in which they occur. Biological diversity also refers to the compositions, structures, and functions of species and habitats and their interactions.

browse
Twigs, leaves, and young shoots of trees and shrubs that animals eat. Browse is often used to refer to the shrubs eaten by big game, such as elk and deer.

candidate species
Plant and animal species being considered for listing as endangered or threatened, in the opinion of the U.S. Fish & Wildlife (FWS) or the National Marine Fisheries Service (NMFS). Category 1 candidate species are groups for which the FWS or NMFS has sufficient information to support listing proposals; category 2 candidate species are those for which available information indicates a possible problem but need further study to determine the need for listing.

canopy
(1) The vertical projection downward of the aerial portion of vegetation, usually expressed as a percent of the ground so occupied. (2) The aerial portion of the overstory vegetation.

capability
The potential of an area of land to produce resources, supply *goods and services*, and allow resource uses under an assumed set of management practices at a given level of management intensity. Capability depends upon current conditions and site conditions such as climate, slope, landform, soils, and geology, as well as the application of management practices, such as silviculture or protection from fire, insects, and disease.

cavity
A hole in a tree often used by wildlife species, usually birds, for nesting, roosting, and reproduction.

cfs (cubic feet per second)
A unit of measurement in cubic feet of the amount of water flowing in an area.

clearcut
A harvest method removing all trees in a *stand* in one cutting.

climax
The culminating stage in plant succession for a given site. Climax vegetation is stable, self-maintaining, and self-reproducing.

Code of Federal Regulations (CFR)
The general and permanent rules published in the Federal Register by the Executive departments and agencies of the federal government.

community
An assemblage of populations of plants and /or animals in a common spatial arrangement.

composition (species)
The species that make up a plant or animal community, and their relative abundance.

concentrated use area
Concentrated Use Area (CUA) is where the Forest Service invest management time or dollars for the management of sites or areas of recreation activity that leave evident impacts, such as litter, vandalism, or soil compaction. Any constructed features or management activities are

primaryily for resource protection rather than user convenience. The primary management objective is to protect and stabilize natural resources.

conifer
A tree that produces cones, such as a pine, spruce, or fir tree.

connectivity
The degree to which similar but separated vegetation components of a landscape are connected.

conservation agreement
A formal written agreement for implementing the conservation strategy. It describes specific actions and responsibilities of the participating agrencies.

conservation strategy
A written document describing specific actions required to reduce or eliminate threats to candidate species or species of special concern and to assure their long-term survival.

corridor (landscape)
Landscape elements that connect similar patchers of habitat through an area with different characteristics. For example, streamside vegetation may create a corridor of willows and hardwoods between meadows or through a forest.

cover type
Stands of a particular vegetation type that are composed of similar species. The aspen cover type contains plants distinct from the pinyon-juniper cover type.

critical habitat
Areas designated for the survival and recovery of federally listed threatened or endangered species.

cultural resource
The remains of sites, structures, or objects used by people in the past; this can be historical or pre-historic.

cumulative effects
Impacts on the environment that result from the incremental impact of an action when added to other past, present, and reasonably foreseeable future actions. Cumulative effects can result from individually minor but collectively significant actions taking place over a period of time.

dbh (diameter at breast height)
The diameter of a tree 4 and 1/2 feet above the ground on the uphill side of the tree.

decreaser
Plant species of the original or climax vegetation that will decrease in relative amount with continued overuse.

deferred maintenance
Maintenance that was not performed when it should have been or when it was scheduled and which, therefore, was put off or delayed for a future period. When allowed to accumulate without limits or consideration of useful life, deferred maintenance leads to deterioration of performance, increased costs to repair, and decrease in asset value. Deferred maintenance needs may be categorized as critical or noncritical at any point in time. Continued deferral of noncritical maintenance will normally result in an increase in critical deferred maintenance. Code compliance (e.g. life safety, ADA, OSHA, environmental, etc.), Forest Plan Direction, Best Management Practices, Biological Evaluations other regulatory or Executive Order compliance requirements, or applicable standards not met on schedule are considered deferred maintenance. (Financial Health - Common Definitions for Maintenance and Construction Terms, July 22, 1998)

Desired Future Condition (DFC)
A portrayal of the land, resource, or social and economic conditions that are expected to result in 50-100 years if objectives are achieved. A vision of the long-term conditions of the land.

dispersed recreation
Dispersed Recreation is where undeveloped recreation activities and their associated impacts are dispersed through out the Forest. Any constructed amenities or management are for resource protection rather than user convenience. Undeveloped Recreation and Concentrated Use Area are included in Dispersed Recreation.

disturbance
Any event, such as wildfire or a timber sale, that alters the structure, composition, or function of an ecosystem.

disturbance regime
All known current and historical *disturbances* of a subject area.

down woody debris
Dead woody material, such as limbs and large roots, on the ground or in streams.

ecological function
The process through which the constituent living nonliving elements of ecosystems change and interact, including biogeochemical processes and succession.

ecological processes
The actions or events that link organisms (including humans) and their environment such as disturbance, successional development, nutrient cycling, carbon sequestration, productivity, and decay.

ecological status
The present state of vegetation of an ecological site in relation to the potential natural community for the site. Vegetation status is the expression of the relative degree to which the kinds, proportions, and amounts of plants in a community resemble that of the potential natural

community. Described in ecological terms, which are early seral, mid seral, and late seral.

ecosystem
An arrangement of living and non-living things and the forces that move among them. Living things include plants and animals. Non-living parts of ecosystems may be rocks and minerals. Weather and wildfire are two of the forces that act within ecosystems.

ecosystem health
A condition where the parts and functions of an ecosystem are sustained over time and where the system's capacity for self-repair is maintained, such that goals for uses, values, and services of the ecosystem are met.

ecotone
The transition zone between two biotic communities, such as between the spruce-fir forest type and the mixed conifer forest, which is found at lower elevations than the spruce-fir.

edge
The margin where two or more vegetation patches meet, such as a meadow opening next to a mature forest stand, or a ponderosa pine stand next to an aspen stand.

endangered species
A plant or animal that is in danger of extinction throughout all or a significant portion of its range. The Secretary of the Interior in accordance with the Endangered Species Act of 1973 identifies endangered species.

endemic plant/organism- A plant or animal that occurs naturally in a certain region and whose distribution is relatively limited geographically. (see also: *indigenous, global distribution*)

ephemeral
A stream or portion of a stream that flows only in direct response to precipitation, receiving little or no water from springs and no long continued supply from snow or other sources, and whose channel is at all times above the water table.

erosion
The wearing away of the land surface by wind or water.

exotic species
All species of plants and animals not naturally occurring, either presently or historically, in any ecosystem of the United States.

fauna
The animal life of an area.

fish-bearing streams
Stream segments that support fish during all or a portion of a typical year.

fisheries habitat
Streams, lakes, and reservoirs that support fish, or have the potential to support fish.

floodplain
The land bordering a stream or river subject to overflow flooding during periods of high water level.

flora
The plant life of an area.

forage
Plant material (usually grasses, forbs, and brush) that is available for animal consumption.

forbs
Broadleaf ground vegetation with little or no woody material.

forest cover type
See *cover type*.

forest health
A measure of the robustness of forest ecosystems. Aspects of forest health include biological diversity; soil, air, and water productivity; natural disturbances; and the capacity of the forest to provide a sustaining flow of goods and services for people.

fragmentation
The splitting or isolating of patches of similar habitat, typically forest cover, but including other types of habitat. Habitat can be fragmented naturally or from forest management activities.

global distribution
The occurrences of plant and animals over their range. Commonly refered to in terms of endemism including disjunct (seperated from the main population), local endemic (range of distribution is less than 100 square miles), regional endemic (global distribution is between 100 and 10,000 square miles), sparsely distributed (widespred but sporadic), peripheral (on the edge of its range), widespread, and circumboreal or circumpolar.

global ranking
Global rank indicator is based on the worldwide distribution at the species level.
- **G1** = Less than 6 viable element occurrences (EO) OR less than 1,000 individuals OR less than 2,000 acres.
- **G2** = 6-20 EOs OR 1,000-3,000 individuals OR 2,000-10,000 acres.
- **G3** = 21-100 EOs OR 3000-10000 individuals OR 10,000-50,000 acres.
- **G4** = Apparently secure; this rank is clearly lower than G3 but factors exist to cause some concern (i.e., there is some threat, or somewhat narrow habitat).
- **G5** = Population or stand demonstrably secure to ineradicable due to being commonly found in the world

goal
A concise statement that describes a desired condition to be achieved some time in the future. It is normally expressed in broad, general terms, without any specific date for attainment.

grazing system
A specialization of grazing management, which defines the periods of grazing and non-grazing. Grazing system should consist of at least the following: the number of pastures; number of herds; length of grazing period; length of non-grazing periods for any given unit in the system. Examples are Deferred Rotation and Rest Rotation.

greenline
That area where a more or less continuous cover of perennial vegetation is encountered when moving away from the center of the stream channel. These communities may range in width from a few inches to several feet and may be at the water's edge, on a stream bar, or on an adjacent stream terrace.

ground cover
The percentage of material, other than bare ground (or pavement – rock less than ¾ inch in diameter), covering the land surface. It may include live vegetation, standing dead vegetation, litter, cobble, gravel, stones and bedrock. Ground cover plus bare ground and pavement would total 100 percent.

ground cover standard
The desired amount (percent) of ground cover for each cover type, which is described as 85 percent of the potential for each type. Values are included in the Wasatch-Cache National Forest, Revised Forest Plan.

guideline
The preferred or advisable course of action designed to promote the achievement of *goals* and *objectives*.

habitat
The place where a plant or animal lives and grows under natural conditions.

head month
Tenure of one herbivore on National Forest for a period of one month.

home range
In regards to goshawk habitat, the area that a goshawk habitually uses during nesting, resting, bathing, foraging, and roosting. A nesting home range contains nest areas (*active nests* and historical nests), the *Post Fledgling Area (PFA)*, and the foraging area (Utah Northern Goshawk Project Environmental Assessment, October 1999).

hydrology
The study of the properties, distribution, and circulation of water on the earth's surface, in the soil and rocks, and in the atmosphere.

increaser
Plant species of the original vegetation that increase in relative amount, at least for a time, under overuse.

indicators
A measure of or surrogate for the elements of ecosystem management.

indigenous (species)
A species which originally inhabitated a particular National Forest or National Grassland.

instream flow
The quantity of water necessary to meet seasonal stream flow requirements to accomplish the purposes of the National Forests, including, but not limited to fisheries, visual quality, and recreational opportunities.

intermittent stream
A stream or portion of a stream that does not flow year-round but only when it receives base flow solely during wet periods, or receives groundwater discharge or protracted contributions from melting snow or other erratic surface and shallow subsurface sources.

key area
A portion of range, which, because of its location, grazing, or browsing value, and or use serves as an indicative sample of range conditions, trend, or degree of use seasonally. (A key area guides the general management of the entire area of which it is a part.)

key species
Forage species whose use serves as an indicator to the degree of use of associated species. Or, Those species which must, because of their importance, be considered in the management program.

landscape
A large land area composed of interacting ecosystems that are repeated due to factors such as geology, soils, climate, and human impacts. Landscapes are often used for coarse grain analysis.

litter
The freshly fallen or only slightly decomposed plant material covering the soil surface.

Lynx Analysis Unit (LAU)
An project analysis unit upon which direct, indirect, and cumulative effects analyses are performed. LAU boundaries remain constant to facilitate planning and allow effective monitoring of habitat changes over time. They are generally the size used by an individual lynx, about 25-50 square miles. These units were developed in conjunction with the U.S. Fish and Wildlife Service and the Utah Division of Wildlife Resources.

macroinvertebrate
An animal having no backbone or internal skeleton, large enough to be seen without magnification.

MIS (Management Indicator Species)

Representative species whose habitat conditions and population changes are used to assess the impacts of management activities on similar species in a particular area.

monitoring
The process of collecting information to evaluate if objectives and anticipated results of a management plan are being realized, or if implementation is proceeding as planned.

native species
All species of plants and animals naturally occurring, either presently or historically, in any ecosystem of the United States.

natural range of variability
See *range of variability*

NEPA (National Environmental Policy Act)
An abbreviation for the National Environmental Policy Act of 1969, which requires environmental analysis and public disclosure of federal actions.

niche
A situation or activity specially suited to a Forest's character or ability.

noxious weed
Those plant species designated as noxious weeds by the Secretary of Agriculture or by the responsible State official. Noxious weeds generally possess one or more of the following characteristics: aggressive and difficult to manage, poisonous, toxic, parasitic, a carrier or host of serious insects or disease, and being native or new to or not common to the United States or parts thereof (FSM 2080).

objective
A concise time-specific statement of measurable planned results that move toward pre-established *goals*. An objective helps define the precise steps to be taken and the resources to be used in achieving identified *goals.*

OHV (Off Highway Vehicle)
See *ORV*

ORV (Off-Road Vehicles),
Vehicles such as motorcycles, 4-wheel drive vehicles, and 4-wheelers.

overgrazing
Continued heavy grazing that exceeds the recovery capacity of the community and creates a deteriorated range.

overstory
In a forest with multiple layers of vegetation, the portion of the trees forming the uppermost (canopy) layer.

partial cut
A cutting by which only a part of the stand is removed. It usually implies a series of such cuttings.

perennial
When referring to bodies of water, perennial waters are defined as waters that are present during all seasons of a year.

PFC
See Properly Functioning Condition.

point source
A source of pollutants that is discernable and confined such as a pipe, ditch, channel, conduit, or tunnel. Point sources exclude agricultural discharges (see *non-point source*).

pole/sapling
The stage of forest succession in which trees are between 3 and 7 inches in diameter and are the dominant vegetation.

Post Fledgling Area (PFA)
In reference to goshawk habitat, an area of concentrated use by the goshawk family after the young leave the nest. (From the Utah Northern Goshawk Project Environmental Assessment, October 1999). Identify a Post-Fledgling Area (PFA) that encompasses the active, alternate, and replacement goshawk nest sites and additional habitat needed to raise fledglings. A PFA should be approximately 420 acres in size (in addition to the 180 nest area acres) when sufficient suitable habitat exists. If sufficient amounts of suitable habitat are not present, use existing suitable habitat that is available.

prescribed fire
Any fire ignited by management actions to meet specific objectives. A written, approved prescribed fire plan must exist, and NEPA requirements must be met before ignition

properly functioning condition (PFC)
Ecosystems are in PFC when they function within their historic range of variability.

proposed action
The project or set of activities that a federal agency intends to implement, as defined in NEPA regulations.

rangeland
Land on which the principle natural plant cover is composed of native grasses, forbs, and shrubs that are valuable as forage for livestock and big game.

rangeland condition

satisfactory. When the desired rangeland condition is being met or short-term objectives are being achieved to move the rangeland toward desired conditions; either meeting or moving toward desired conditions.

unsatisfactory. When the desired rangeland condition is not being met and short-term objectives are not being achieved to move the rangeland toward desired conditions; not meeting or moving toward desired conditions.

range management
The art and science of planning and directing range use intended to yield the sustained maximum animal production and perpetuation of the natural resources.

recommended sensitive plant- Those plants that meet the criteria for the regional sensitive species list, but have not been formally placed on the list.

Recreation Opportunity Spectrum (ROS)
A framework for stratifying and defining classes of outdoor recreation environments, activities, and experience opportunities. The settings, activities, and opportunities for obtaining experiences are arranged along a continuum or spectrum divided into six classes--primitive, semiprimitive non-motorized, semiprimitive motorized, roaded natural, rural, and urban.

rest
Leaving an area ungrazed, thereby foregoing grazing of a forage crop. Normally, rest implies absence of grazing for a full growing season.

rest rotation
A grazing-management scheme in which rest periods for individual pastures, paddocks, or grazing units, generally for the full growing season, are incorporated into a grazing rotation.

riparian (riparian ecosystem)
Land areas that are directly influenced by water. They usually have visible vegetative or physical characteristics showing this water influence. Steamsides, lake borders, or marshes are typical of riparian areas. The ecosystems around or next to water areas that support unique vegetation and animal communities as a result of the influence of water.

ROS
See *Recreation Opportunity Spectrum*

satisfactory rangeland condition
See *rangeland condition.*

scoping
The process the Forest Service uses to determine, through public involvement, the range of issues that the planning process should address.

sensitive species
Plant and animal species, selected by the Regional Forester, for which population viability is a concern, as evidenced by significant current or predicted downward trends in population numbers or density, and significant current or predicted downward trends in habitat capability that would reduce a species' existing distribution. Sensitive species are not covered in the Endangered Species Act.

seral stage
The stage of succession of a plant or animal community that is transitional. If left alone, the earlier seral stages will give way to another community that representes a further stage of succession. For example, following fire, forests are replaced by shrubs and/or herbaceous plant communities. These are described as being in an early seral stage.

snag
A standing dead tree.

Species At Risk (SAR)
Federally listed endangered, threatened, candidate, and proposed species and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk include sensitive species and may include state listed species. A species-at-risk also may be selected as a focal species.

For the Wasatch-Cache Plan revision, the term "species-at-risk" includes:
- -Fish and Wildlife Service endangered, threatened, candidate, proposed species.
- -Regional Forester designated sensitive species.
- -Wasatch-Cache National Forest recommended sensitve species, which are other species that meet the definition of sensitive, but have not been officially listed as sensitive

Also considered for inclusion as species-at-risk were species identified by:
- -The Nature Conservancy as G1, G2,G3, T1, T2, and T3.
- -State Natural Heritage programs as S1, and S2
- -Partners in Flight species of concern.
- -The Forest that do not appear on any other lists.

The SAR list is dynamic and species will be added as deemed necessary or removed as recovery occurs or new information indicates they are not at risk.

stand
A contiguous group of trees sufficiently uniform in *age class* distribution, *composition*, and *structure*, and growing on a site of sufficiently uniform quality to be a distinguishable unit.

standard
A required course of action or a level of attainment designed to promote achievement of *goals* and *objectives*.

state rankings

State rank indicator, based on distribution within Utah or Wyoming at the lowest taxonomic level.

- **S1** = Less than 6 EOs OR less than 100 individuals OR less than 2000 acres
- S2 = 6-20 EOs OR 1000-3000 individuals OR 2000-10000 acres
- S3 = 21-100 EOs OR 3000-10000 individuals OR 10000-50000 acres
- S4 = Apparently secure within the State; this rank is clearly lower than S3 but factors exist to cause some concern (i.e., there is some threat, or somewhat narrow habitat. NO THREAT RANK.
- S5 = Demonstrably secure to ineradicable in the State. NO THREAT RANK.

structure
The size and arrangement, both vertically and horizontally, of vegetation.

stubble height
The heighth of vegetation, typically key riparian species, following grazing.

succession
The replacement in time of one plant community with another. The prior plant community (or successional stage) creates conditions that are favorable for the establishment of the next stage.

sustainability
The ability to maintain a desired condition or flow of benefits over time.

threatened species
Designated by the U.S. Fish and Wildlife Service, a plant or animal species likely to become endangered throughout all or a specific portion of its range within the foreseeable future.

unsatisfactory rangeland condition
See r*angeland condition.*

utilization standard
The amount of vegetation that may be grazed while maintaining satisfactory rangeland conditions or to moving vegetation toward satisfactory rangeland conditions, if currently unsatisfactory.

viable populations
A population which has the estimated numbers and distribution of reproductive individuals to insure its continued existence is well distributed in the planning area (36 CFR 219.19).

watch list plants
The Wasatch-Cache National Forest designates watch list plant species. These species do not meet the definition of Species At Risk, but their populations may be on the edge of their range, disjunct, local endemics, or regional endemics, or are rare throughout their distribution but, through analysis, are found to be relatively unaffected by activities that occur on the Forest. These plants have stable population numbers, density, and habitat capability, and are predicted to remain stable. Should populations of these plants be negatively effected by allowed activities, a review of impacts may result in plants being recommended as Threatened, Endangered, or Sensitive.

watershed
A land area that contributes all its water to one drainage system, basin, stream, or river. Watersheds can be described at multiple scales. For example, the entire area draining to the Green River, above its confluence with the Colorado River, is a watershed. Likewise, the area draining to the Duchesne River above its confluence with the Green River is also a watershed, as is the drainage of Wolf Creek above its confluence with the West Fork of the Duchesne River. In this *DEIS* and Draft Forest Plan, "watershed" specifically refers to a drainage area of approximately 50,000 to 100,000 acres, which is equivalent to a 5th order *Hydrologic Unit Code*. See *Hydrologic Unit Code (HUC)* for more information on watershed classifications.

wetland
An area that is either permanently inundated with water or has seasonally high water tables that support vegetation requiring these conditions for growth and reproduction. See also *non-stream or -lake related wetlands* and *stream or lake related wetlands*.

Index

This list of terms is intended to assist the reader in locating a broad scope of subject areas discussed in this document. The reference to specific page numbers is not intended to be all-inclusive.

G

H

I

K

M

N

P

R

S

T

U

W

APPENDICES

Appendix A

Scoping Letter for North Rich Allotment Environmental Analysis

United States Department of Agriculture | Forest Service | Wasatch-Cache National Forest | 1500 East Hwy. 89
Logan, UT 84321
Tel. 435-755.3620
Fax 435-755-3639

Reply to: 1950
Date: January 8, 1999

Dear Forest User,

The Logan Ranger District is beginning an environmental analysis of the land and resources contained within the North Rich-Cattle Allotment. Enclosed you will find the scoping document for this analysis. Please review this information and provide us with your suggestions and comments on any phase of the proposal, the preliminary issues, or the preliminary alternatives.

We would also like to invite you to an open house to be held on Wednesday, January 20, 1999, from 6 to 8 p.m., at the Logan District Office (1500 East Hwy. 89). Preliminary information regarding the proposal will be available. We will be taking comments at that meeting, as well as accepting written comments mailed in response to the enclosed scoping document.

Your input regarding the proposed projects are valuable to us as we gather information and begin the analysis. Your suggestions will be considered and incorporated into our planning process.

Please have your comments to us by February 8, 1999. If you have questions, feel free to call me or Evelyn Sibbernsen at the Logan District Office.

Thanks for participating in this important decision-making process.

Sincerely,

Brian Ferebee

BRIAN FEREBEE
District Ranger
Caring for the Land and Serving People

SCOPING LETTER

Environmental Assessment of the North Rich Allotment

Logan Ranger District
Wasatch-Cache National Forest
Cache and Rich Counties, Utah

The Purpose of This Letter

This letter is to inform you that the Logan Ranger District is initiating an environmental assessment of the laud and resources contained within the North Rich Cattle Allotment (see attached map). The allotment covers 27,198 acres in the eastern portion of the district (23,253 acres National Forest, 1920 acres private, and 2025 acres State lands). It lies within the Cache Management Area of the Wasatch-Cache Land and Resource Management Plan (Forest Plan), approved in 1985.

We would like to hear your comments, concerns, and suggestions regarding the future management of the resources within this allotment.

What Is Being Proposed?

The Logan Ranger District proposes to adjust the resource management of lands within the North Rich Allotment to reflect additional information developed since the Forest Plan.

The lands within the Cache Management Area (as described in the Forest. Plan, pages IV- 254 to IV-281) provide a wide variety of values, including scenic, recreational, watershed, wildlife, range, and timber. The Forest Plan guides all resource management activities for the Forest at a programmatic (general) level. The Plan allows for a multitude of uses within the management area, including grazing. However, it sets no specific desired future condition for rangelands nor does it contain specific standards necessary to sustain healthy rangeland and riparian ecosystems.

The Rangeland Health EIS for the Wasatch-Cache National Forest (Record of Decision, March 26, 1996) was developed to establish more specific desired future conditions (DFCs) for four rangeland ecosystem types: riparian, uplands, aspen, and alpine. The EIS also includes standards and guidelines by which rangelands are to be managed, to provide for longterm, sustainable and healthy rangeland and riparian ecosystems.

The Logan Ranger District proposes to authorize grazing on the North Rich Allotment at a level and in a manner consistent with direction set forth in the Forest Plan, the Rangeland Health ETS, and other applicable laws and guidelines.

In an effort to continue moving present rangeland condition towards the desired future condition as described in the Rangeland Health EIS, select improvement and restoration projects would be implemented. Livestock grazing, dispersed recreation, and other land uses would be managed to provide for the longterm health and sustainability of rangeland and riparian ecosystems.

Why Are We Proposing This Project?

The Forest Plan establishes goals and objectives and provides general direction for project level decisions. In providing this direction, the Forest Plan states that "livestock will continue to be a major use of the Cache Management Area" and that "all allotments should be placed under quality management after completing range environmental studies, analyzing present management, and updating allotment management plans".

Preliminary field reviews conducted by the interdisciplinary team in 1998 indicate some portions of the North Rich Allotment do not fall within the broadly defined desired future condition as described in the Rangeland Health EIS. There is a need to improved resource conditions in some localized areas of the allotment.

Several natural, unprotected water sources (springs, seeps, streams) are being utilized to the degree where unacceptable impacts are occurring. Overutilization of vegetation (historic and current) in some areas has resulted in decreased plant vigor, decreased structural diversity, loss of site productivity, and a potential loss of habitat for wetland-dependant wildlife species and invertebrates. Vegetation loss and compaction of soils in some riparian areas has resulted in destabilization of streambanks.

There is a need to improve these localized situations and continue moving the rangeland condition towards the desired future condition. The existing allotment management plan needs to be revised to reflect the information and direction set forth in the Forest Plan and Rangeland Health EIS.

Background Information

The rangelands within the analysis area have a long history of grazing. The area was grazed by domestic livestock (cattle and sheep) beginning in the mid-to-late 1800's. Mountain rangelands were open to everyone, heavily grazed, with little or no restriction on use.

Early in the 1900's it became apparent that unrestricted use of the forest and rangelands for timbering and grazing was becoming detrimental to the productivity of the land. It was at that time, 1908, that the Cache National Forest was named, and directed to initiate a program of management for the forest and rangelands. It was then the present permit system for using public lands began.

Since that time rangelands within the North Rich Allotment have been under some form of permit. There have been several adjustments made to the number, season, and systems of livestock grazing over the years.

In the mid-1960's extensive range surveys were conducted in this area (and throughout much of the Intermountain West), providing inventory information on range condition and trend. Carrying capacities were established for this and other areas based on this information. Use levels were decreased in those areas in poor condition, showing no positive trend. Since the 1960's additional reductions in use have been imposed, based on more recent monitoring of range conditions and trends.

There are currently nine permitees holding term grazing permits associated with this allotment. There is one term grazing permit associated with the private land within the allotment. The permits axe authorized for a period of ten years, with varying expiration dates.

The existing allotment management plan authorizes 1329 head of livestock, on a season-long continuous grazing system, for a period of 80 consecutive days.

Preliminary Alternatives

The following are preliminary alternatives to be considered. There may be other alternatives developed during the analysis based on the issues raised during this information-gathering period.

Alternative 1. No action. Under this alternative, no livestock grazing would be authorized beyond the expiration of existing permits.

Alternative 2. This alternative would continue the number of livestock, season of use (80 consecutive days between June 16 and September 30), and grazing system (season-long continuous) currently authorized for the allotment. Current developments and improvements would be maintained to Forest Service standards.

Other Alternatives. Other combinations of number of livestock, season of use, grazing system (such as rest rotation or deferred rotation) would be developed to address is- sues and move towards desired resource conditions. Select range improvements and/or restoration practices would be included in the alternatives to address the needs for improved rangeland health, particularly riparian condition and streambank stability.

Improvements would include such things as fencing (construct, reconstruct, or repair fences for pastures), fencing for protection of some riparian areas (streams, springs, and seeps), and development and placement of ponds, troughs, pipelines, and salt for better distribution of livestock.

The improvements included in the alternatives would provide the opportunity to enhance riparian conditions (natural springs and seeps), stabilize streambanks, improve age class diversity of ground cover and species diversity in the sagebrush communities, and maintain or improve habitat for goshawk (a sensitive species found in this area).

Preliminary Issues

As we have begun to discuss the management of the North Rich Allotment, some preliminary issues have been raised. These and any other concerns you may have regarding the proposal outlined above will be addressed as we proceed with the environmental analysis.

Preliminary Issues

1. The effects on rangeland vegetation condition, relative to the desired future conditions DFCs) and properly functioning condition (PFC) as described for the vegetation communities in this area.

2. The effects on riparian and upland watershed conditions.

3. The effects on soil stability and longterm productivity.

4. The effects of livestock on dispersed recreation activities in the area.

5. The effects of dispersed recreation on rangeland resources.

6. The effects on threatened, endangered, or sensitive plant and animal species.

7. The effects on and competition for critical wildlife habitat.

8. Maintenance of improvements and administration of permits.

What Is the Decision To Be Made?

As a result of this analysis, a decision will be made whether or not to continue authoriz- ing grazing on the North Rich Allotment. If yea, the decision will include the approximate number of livestock, season of use, grazing system, upland and riparian utilization standards, ground cover standards, associated improvements, and measures required to mitigate environmental effects.

Term grazing permits would be required to authorize this use. Grazing permits would include "terms and conditions" which would meet management prescriptions designed to achieve desired resource conditions. Standards and guidelines from the Forest Plan and Rangeland Health EIS would be integrated into the term grazing permits.

The Logan District Ranger is the official responsible for making the decision whether or not to continue livestock grazing on the North Rich Allotment, and if so, to what level and with what improvements.

What Do We Want To Hear From You?

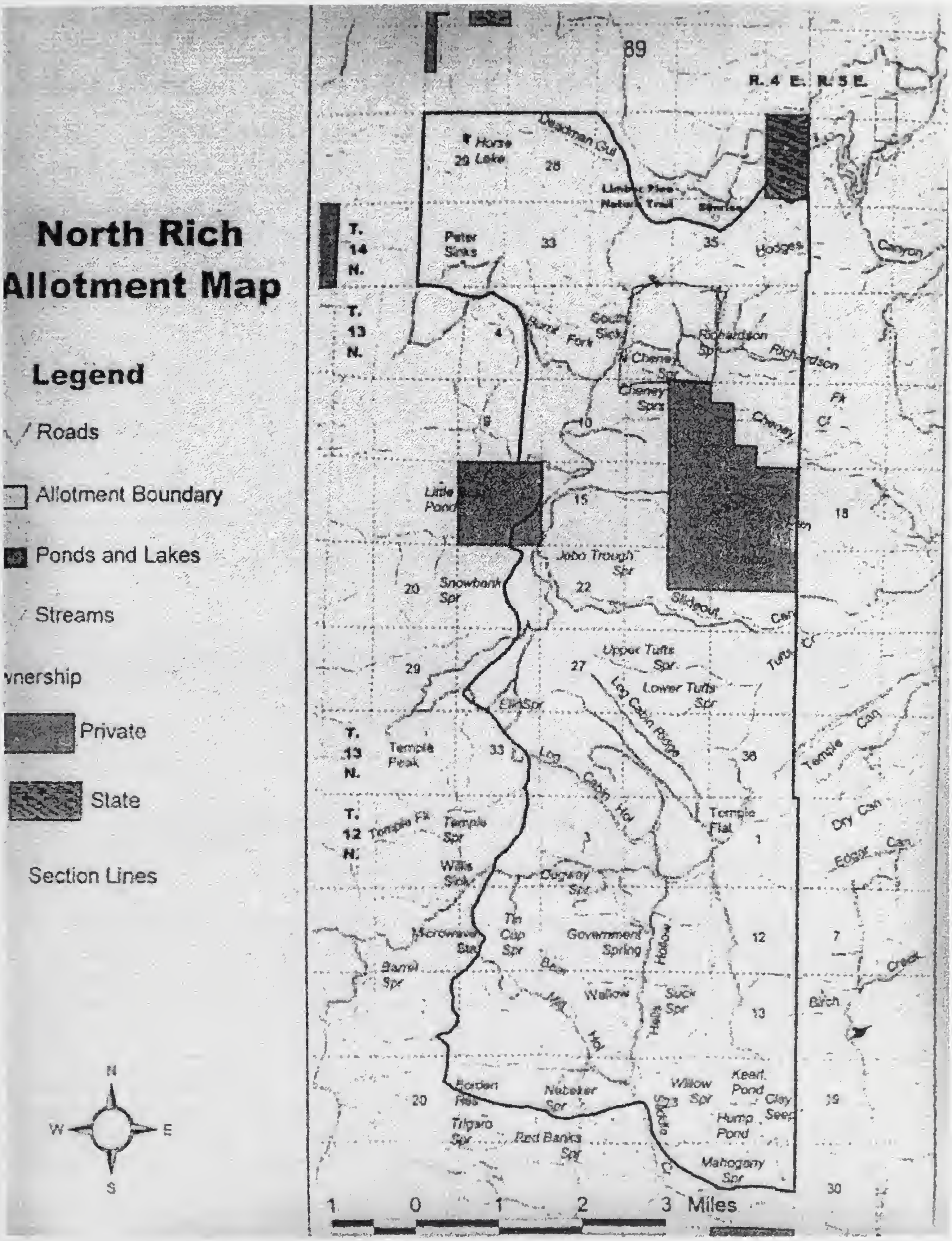
We would like to know whether you may have additional issues you believe need to be addressed. We would also like to know whether and at what point you would like to be involved in the environmental analysis. Another opportunity for input will occur when the predecisional environmental assessment (EA) is complete. That document will be sent to you if you so note on the enclosed response form.

To be most useful, please limit your specific comments to the area within the context of this analysis (North Rich Allotment). You may use the enclosed form or a letter of similar format.

Comments received in response to this letter will be available for public review and will be released in their entirety if requested pursuant to the Freedom of Information Act.

When Do We Need It?

If you wish to become involved in this process please return the enclosed response form to us by **February 8, 1999**.


North Rich
Allotment Map
Legend
Roads
Allotment Boundary
Ponds and Lakes
Streams
Private
State
Section Lines
N
W
E
S
R. 4 E.
R. 5 E.
T.
14
N.
T.
13
N.
T.
12
N.
89
Horse
Lake
Deadman Gul
Peter
Sinks
Hodges
Canyon
South
Sink
Richardson
Spr
Cheney
Spr
Cheney
Sprs
Little Bear
Pond
Jebo Trough
Spr
Snowbank
Spr
Upper Tufts
Spr
Lower Tufts
Spr
Log Cabin Ridge
Temple
Peak
Temple
Spr
Temple Fk
Temple
Flat
Willis
Sink
Dugway
Spr
Tin
Cup
Spr
Government
Spring
Hollow
Microwave
Sta
Barrel
Spr
Wallow
Suck
Spr
Birch
Creek
Dry Can
Edgar
Can
Temple
Can
Willow
Spr
Kearl
Pond
Clay
Seep
Hump
Pond
Nebeker
Spr
Red Banks
Spr
Mahogany
Spr
Trigaro
Spr
1
0
1
2
3
Miles

**PUBLIC RESPONSE TO THE PROPOSED ACTION
FOR THE
NORTH RICH ALLOTMENT**

Please return to the address on the reverse by February 8, 1999.

Comments on the proposed action, preliminary issues, and alternatives as listed above:

Please check the boxes that apply:

☐ Send me a copy of the predecision environmental analysis document

☐ Send me a copy of the formal decision document

☐ I have no further interest in this proposal and do not want to receive further mailings regarding this project

Name ______________________________

Organization (if applicable) ______________________________

Address ______________________________

____

Appendix B

Potential Treatment Areas for the North Rich Allotment

Table B.1 Potential Riparian Fencing Projects on North Rich Allotment

Site	Approximate Acres	Location
NRR4	4	Government Spring
NRR5[1]	9	Head of Hells Hollow
NRR6[1]	3	Middle part of Hells Hollow
NRR7	4	Clay Seep
NRR8	3	Hump Pond
NRR9	8	Confluence of Mill Hollow and tributary north of Nebeker Spring
NRR11	3	West of Mill Spring
NRR16[1]	2	Tufts Creek near eastern border of allotment
NRR18	3	Cheney Spring
NRC1	2	Mahogany Spring (This is actually on the Saddle Creek Allotment)
NRC2	4	Elk Spring
XXX	10	Willow Springs

[1] Cultural resource surveys will be conducted prior to implementation of these projects.

Table B.2 Potential Upland Vegetation Treatment Projects on the North Rich Allotment

Location	Cover Type	Acres	Treatment
Horse Lake	Aspen	34	Prescribed Fire
South Peter Sink	Aspen	195	Prescribed Fire
Upper Hodges	Aspen	35	Prescribed Fire
Cheney-Richardson Fork	Aspen	507	Prescribed Fire
Jebo Canyon	Aspen	165	Prescribed Fire
Slideout Canyon North	Aspen	349	Prescribed Fire
Hells Hollow –Bear Wallow	Aspen	728	Prescribed Fire
Mill Hollow South	Aspen	527	Prescribed Fire
Birch - Edgar	Aspen	135	Prescribed Fire
Southeast Allotment	Aspen	278	Prescribed Fire
Middle Sink	Sagebrush	30	Spike, prescribed fire, and/or rotobeat & seed
Peter Sinks	Sagebrush	165	Spike, prescribed fire, and/or rotobeat & seed
South Sinks	Sagebrush	400	Spike, prescribed fire, and/or rotobeat & seed
Richardson	Sagebrush	70	Spike, prescribed fire, and/or rotobeat & seed
Lower Cheney	Sagebrush	85	Spike, prescribed fire, and/or rotobeat & seed
Tincup	Sagebrush	186	Spike, prescribed fire, and/or rotobeat & seed
Mill Hollow → Hells Hollow	Sagebrush	117	Spike, prescribed fire, and/or rotobeat & seed
Mill Hollow → Southern Allotment Boundary	Sagebrush	52	Spike, prescribed fire, and/or rotobeat & seed
South Sinks	Tall Forb	6	Spike, prescribed fire, and/or rotobeat & seed
Upper Jebo	Tall Forb	36	Spike, prescribed fire, and/or rotobeat & seed

Appendix C

History of Use on the North Rich Allotment

Year	# Permittees	Actual Grazed C&H/S&G	Grazing System	Permitted Season	Tentatively Authorized Season	Actual Authorized Season	Actual Grazed Season
1921	30	1190/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	unknown
1930	unknown	660/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	unknown
1935	unknown	709/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	05/16-10/10
1936	unknown	671/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	05/16-10/11
1937	unknown	683/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	05/16-10/15
1938	unknown	694/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/21-10/15	05/21-10/15
1939	unknown	621/ 3-5000	Common Use	05/16-10/15 (150 days)	05/16-10/15	05/16-10/15	05/16-10/15
1940	unknown	unknown	Common Use (portions)	05/16-10/15 (150 days)	unknown	unknown	unknown
1941	unknown	841/ 3-5000	Common Use (portions)	06/16-10/15 (120 days)	06/16-10/15	06/06-10/06	06/06-10/06
1942	unknown	1462/ 3-5000	Common Use (portions)	06/16-10/15 (120 days)	06/16-10/15	06/16-10/15	06/06-10/05
1943	unknown	1700/ 3-5000	Common Use (portions)	06/16-10/15 (120 days)	06/16-10/15	06/16-10/15	06/09-10/08
1944	unknown	1759/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-10/05	06/06-10/05
1945	unknown	1837/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-10/05	06/06-10/05
1946	unknown	1814/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-10/05	06/06-10/05
1947	unknown	1864/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-10/05	06/06-10/05
1948	unknown	1994/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/09-10/08	06/09-10/08
1949	unknown	2021/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-10/05	06/06-10/05
1950	unknown	1914/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/12-10/05	06/12-10/05

Year	# Permittees	Actual Grazed C&H/S&G	Grazing System	Permitted Season	Tentatively Authorized Season	Actual Authorized Season	Actual Grazed Season
1951	unknown	1338/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-09/01	unknown
1952	unknown	1805/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/13-09/13	06/13-10/05
1953	unknown	1521/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/11-09/30	06/11-09/30
1954	unknown	1796/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	unknown	unknown
1955	22	1793/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/14-09/27	06/14-09/27
1956	24	1644/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/08-10/05	unknown
1957	24	1733/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/12-10/05	unknown
1958	24	1757/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/11-10/05	unknown
1959	22	1749/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/16-10/05	06/16-09/15
1960	21	1096/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/06-09/16	06/06-09/16
1961	15	842/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/12-09/20	06/12-09/20
1962	15	847/ 3-5000	Common Use (portions)	06/06-10/05 (120 days)	06/06-10/05	06/11-09/20	06/11-09/20
1963	36	1350	Season long	06/16-09/30 (105 days)	06/16-09/30	06/16-09/30	06/16-10/05
1964	35	1247	Season long	06/16-09/30 (105 days)	06/16-09/30	06/19-09/30	06/19-09/20
1965	33	1311	Season long	06/16-09/30 (105 days)	06/16-09/30	06/21-09/20	06/21-09/20
1966	27	1319	Season long	06/16-09/30 (105 days)	06/16-09/30	06/16-09/30	06/16-09/20
1967	24	1230	Season long	06/16-09/30 (105 days)	06/16-09/30	06/20-09/30	06/20-09/15
1968	23	1235	Season long	06/16-09/30 (105 days)	06/16-09/30	06/20-09/30	06/20-09/30

Year	# Permittees	Actual Grazed C&H/S&G	Grazing System	Permitted Season	Tentatively Authorized Season	Actual Authorized Season	Actual Grazed Season
1969	19	815	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/20	06/21-09/20
1970	17	862	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/15	06/21-09/15
1971	19	930	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/10	06/21-09/10
1972	19	1003	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/10	06/21-10/01
1973	19	962	Rest Rotation	06/21-09/05 (75 days)	06/22-09/05	06/22-09/05	06/22-09/05
1974	19	866	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/05	06/21-09/05
1975	21	919	Rest Rotation	06/21-09/05 (75 days)	07/01-09/05	07/01-09/05	07/01-09/05
1976	20	925	Rest Rotation	06/21-09/05 (75 days)	06/21-09/05	06/21-09/05	06/21-09/05
1977	19	958	Rest Rotation	06/16-09/30 (105 days)	06/16-09/30	06/16-09/30	06/16-09/30
1978	18	1329	Rest Rotation	06/16-09/30 (105 days)	06/23-09/30	06/23-09/30	06/23-09/30
1979	17	1299	Rest Rotation	06/16-09/30 (105 days)	06/16-09/30	06/16-09/30	06/16-
1980	17	1299	Rest Rotation	06/16-09/30 (105 days)	06/16-09/30	unknown	unknown
1981	17	1321	Rest Rotation	06/16-09/30 (105 days)	06/16-09/30	06/16-09/30	06/16-09/30
1982	16	1329	Rest Rotation	06/16-09/30 (105 days)	06/25-09/30	06/25-10/07	06/25-10/07
1983	16	1329	Rest Rotation	06/16-09/30 (105 days)	06/25-09/30	06/25-09/30	06/25-
1984	16	1329	Rest Rotation	06/16-09/30 (105 days)	06/28-09/30	06/28-09/30	06/28-09/30
1985	16	1329	Rest Rotation	06/16-09/30 (105 days)	06/14-09/30	06/14-09/30	06/14-
1986	14	1329	Rest Rotation	06/16-09/30 (105 days)	06/23-09/30	06/23-09/30	06/23-09/30

Year	# Permittees	Actual Grazed C&H/S&G	Grazing System	Permitted Season	Tentatively Authorized Season	Actual Authorized Season	Actual Grazed Season
1987	unknown	1329	Rest Rotation	06/16-09/30 (105 days)	unknown	unknown	unknown
1988	14	1329	Rest Rotation	06/16-09/30 (105 days)	06/16-09/30	06/16-09/05	06/16-09/05
1989	13	1329	Deferred Rotation	06/16-09/30 (105 days)	06/16-09/30	06/16-09/15	06/16-09/15
1990	12	1329	Total Allotment	06/16-09/30 (105 days)	06/16-09/30	06/16-09/05	06/16-09/30
1991	12	1288	Total Allotment	06/16-09/30 (105 days)	06/23-09/30	06/23-09/30	06/23-10/06
1992	11	1329	Total Allotment	06/16-09/30 (105 days)	06/11-09/30	06/11-08/15	06/11-08/28
1993	10	1329	Total Allotment	06/16-09/30 (105 days)	06/23-09/30	06/23-09/30	06/23-09/30
1994	9	1329	Season long	06/16-09/30 for 80 days	06/16-09/03	06/16-08/13	06/16-08/16
1995	10	1329	Season long	06/16-09/30 for 80 days	06/30-09/17	06/30-09/16	06/30-09/16
1996	9	1329	Season long	06/16-09/30 for 80 days	07/01-09/18	07/01-09/11	07/01-09/13
1997	9	1320	Season long	06/16-09/30 for 80 days	07/01-09/18	07/01-09/02	07/01-09/02
1998	8	1268	Season long	06/16-09/30 for 80 days	07/01-09/18	06/25-09/12	06/25-09/20
1999	6	1007	Season long	06/16-09/30 for 80 days	07/05-09/22		
2000	6	1260	Season long	06/16-09/30 for 80 days	07/01-09/18		

Appendix D

Existing Range Improvements and their Conditions on the North Rich Allotment

Following is a list of range improvements ant their condition at the time they were last surveyed on the North Rich Allotment. The following descriptions pertain to the condition ratings:

- Good = like new condition; no repairs needed;
- Satisfactory = very little, if any, repairs needed;
- Poor = repairs/maintenance needed to protect investments;
- Critical = failed or failure is imminent; and
- \- = no rating completed

Range Improvement	Condition Rating
1. Sunrise Campground to the East Boundary fence (1.5 miles)	-
2. Hell's Hollow Riparian fence (2.2 miles)	Critical
3. Mill Hollow Boundary fence (1.3 miles)	Poor
4. Sink buck and pole fence (1.5 miles)	Satisfactory
5. Sunrise Campground fence (.5 mile)	-
6. West boundary fence (1.0 miles)	Critical
7. Microwave fence (2.5 miles)	Critical
8. Horse Lake pond	Satisfactory
9. Lois Spring pond (trough)	Satisfactory
10. Burnt Hollow pond	Satisfactory
11. South Sinks ponds (2)	Satisfactory
12. Jebo Spring trough	Satisfactory
13. Government Spring pond	Satisfactory
14. Mill Hollow pond	-
15. Border Reservoir	Poor
16. Cattle Guard Reservoir	-
17. Jebo Spring pond	Good
18. Elk Spring Pond	Satisfactory
19. Elk Spring trough	-
20. South Log Cabin pond	Satisfactory
21. Edgar reservoir	Critical
22. Bush reservoir	Critical
23. Dugway Spring trough	-
24. Dugway Spring pond	Satisfactory
25. Tin Cup pond	Satisfactory
26. Tin Cup trough	-
27. Rock Bottom pond	Satisfactory
28. Fenceline pond	-
29. Sayer pond	-
30. North Side pond	-
31. Bench pond	Critical
32. Ring pond	Critical
33. Junction pond	Satisfactory
34. Nebeker Spring ponds (3)	Satisfactory
35. Cattle Guard reservoir	Satisfactory
36. Junction pond	-

Range Improvement	Condition Rating
37. Bog pond	Satisfactory
38. Bird pond	Satisfactory
39. Upper Line pond	Satisfactory
40. Lower Line Pond	Satisfactory
41. Changeover Pond	Critical
42. Collar pond	-
43. Missing Pond	-
44. South Side pond	Satisfactory
45. Lower North Fork pond	Satisfactory
46. Blue pond	Satisfactory
47. Lower Twin pond	-
48. Switch Back pond	Satisfactory
49. Honey pond	Satisfactory
50. Freckles pond	Satisfactory
51. Meadow pond	Satisfactory
52. Roadside pond	Satisfactory
53. Lone Pine pond	Critical
54. Seep Pond	Critical
55. Fork pond	Critical
56. South Fork pond	Satisfactory
57. Ridge pond	Poor
58. Ollies Hole pond	-
59. State Line pond	-
60. Sunrise trough	-
61. Bench pond	-
62. Clay Seep pond	Poor
63. Hump pond	Poor
64. Dirt pond	Critical
65. Sink Lake pond	Satisfactory
66. Quail Spring pond	Poor
67. Upper Tony reservoir	Critical
68. Lower Tony reservoir	Good
69. Tufts pond	Critical
70. Temple pond	Critical
71. Cow Head pond	Satisfactory
72. Indian pond	Satisfactory
73. Lost Cow pond	Critical
74. Flint pond	Satisfactory
75. Duck pond	Satisfactory
76. Brush Canyon pond	-
77. Weston pond	-
78. Peter Sinks pond	-
79. Richardson Pond	-
80. Upper Slideout Pond	-
81. Slideout Flat pond	Satisfactory
82. Slideout Trough	-
83. Johns pond	-
84. Jebo Aspen Pond	-
85. Cooks pond	-
86. Mill Hollow Springs pond	Critical
87. North Cheney Spring Pond	-
88. Kearl Reservoir	Critical

Appendix E

US Forest Service Survey Results for Breeding Birds (Primarily Neotropical Migrants) Within or Adjacent to the North Rich Allotment

Species	Code	Survey Sites									
		Hells Hollow			Jebo Canyon	Little Bear	Log Cabin		Sinks Road		Snowbank
		1996	1999	2002	2002	2002	1998	2001	1998	2001	2003
Species Diversity →		23	29	40	31	20	29	28	26	27	27
Number of survey points per route →		10	14	14	10	10	10	10	10	10	10
American goldfinch	AMGO							2	1		
American robin	AMRO	18	15	10	10	2	8	8	10	5	8
black-capped chickadee	BCCH					7					
brown-headed cowbird	BHCO	1	1	7							
black-headed grosbeak	BHGR	2	2								
brown creeper	BRCR			1		3	1	3			
Brewer's sparrow	BRES			1					7	5	1
broad-tailed hummingbird	BTLH	3	4	7	3		2			1	2
Cassin's finch	CAFI	2	1				2		3		
California gull	CAGU									5	
cedar waxwing	CEDW					11					
chipping sparrow	CHSP	4		3	2	3	2	1	1		
Clark's nutcracker	CLNU								5		
Cordilleran flycatcher	COFL	5									
common raven	CORA									2	
dark-eyed junco	DEJU	9	13	17	20	14	23	21	11	11	31
downy woodpecker	DOWO										
dusky flycatcher	DUFL	1	4	3	2			1	2		1
fox sparrow	FOSP		1	1							
golden-crowned	GOKI									1	

Species	Code	Survey Sites									
		Hells Hollow			Jebo Canyon	Little Bear	Log Cabin		Sinks Road		Snowbank
		1996	1999	2002	2002	2002	1998	2001	1998	2001	2003
kinglet											
green-tailed towhee	GTTO	5		5	2		1	1		1	
Hammond's flycatcher	HAFL			2	2		1	2			3
hairy woodpecker	HAWO				2		2	1			1
hermit thrush	HETH	6		6	3	20	16	15	6	11	8
house wren	HOWR	2	1	20	4						4
Killdeer	KILL								1		
Lincoln's sparrow	LISP		6				1		5		
MacGillivray's warbler	MAGW		5	1	2		1		4	1	1
mountain bluebird	MOBL		2	3			5			2	
mountain chickadee	MOCH	4	3	7	10	7	14	10	9	8	6
mourning dove	MODO	3	10	8	1				1		1
orange-crowned warbler	OCWA		1	1						1	
olive-sided flycatcher	OSFL	1			3		1	2			
Ovenbird	OVEN				1						
pine siskin	PISI	5	24	18	10	7	34	16	22	16	10
plumbeous vireo	PLVI							2			
red-breasted nuthatch	RBNU	1	2	1	6	7	7	1	8	2	4
ruby-crowned kinglet	RCKI	2	6	1	8	5	5	8	2	10	4
red crossbill	RECR			2	9	6	1	9	8	1	6
red-naped sapsucker	RNSA	1	1		1		2				1
northern flicker	RSFL	9	7	6	3		1	1		1	3
red-tailed hawk	RTHA				1						2

Species	Code	Survey Sites									
		Hells Hollow			Jebo Canyon	Little Bear	Log Cabin		Sinks Road		Snowbank
		1996	1999	2002	2002	2002	1998	2001	1998	2001	2003
Say's phoebe	SAPH										1
song sparrow	SOSP			3							
spotted towhee	SPTO			1							
Stellar's jay	STJA				3						
Townsend's solitaire	TOSO						1				
tree swallow	TRES			5	1						
northern three-toed woodpecker	TTWO		2					3	2	1	
turkey vulture	TUVU									1	
unidentified flycatcher	UNFL			4	1						
unidentified hummingbird	UNHU			2							
unidentified species	UNKN			4	1	3	1	5	9	2	3
unidentified sparrow	UNSP			2							
unidentified swallow	UNSW		3	1							
unidentified warbler	UNWA								1		
unidentified woodpecker	UNWO			3		1	1				
vesper sparrow	VESP		4				1	1	4	1	
warbling vireo	WAVI	12	13	13	7	2	4	2	1	2	8
white-crowned sparrow	WCSP	15	11	10	4			2			4
western tanager	WETA		6	4	4	3	1	9	5	12	4
Williamson's sapsucker	WISA								1		
Wilson's warbler	WIWA		1	1		1					

Species	Code	Survey Sites									
		Hells Hollow			Jebo Canyon	Little Bear	Log Cabin		Sinks Road		Snowbank
		1996	1999	2002	2002	2002	1998	2001	1998	2001	2003
western wood peewee	WWPE		3	4	4	1		2	1		3
yellow warbler	YEWA			5						4	
yellow-rumped warbler	YRWA	5	1	5	9	2	2	3		10	2

Appendix F

Species at Risk

Species at risk have been identified as "federally listed endangered, threatened, candidate, and proposed and other species for which loss of viability, including reduction in distribution or abundance, is a concern within the plan area. Other species-at-risk may include sensitive species and state listed species." For additional information see the Wasatch-Cache National Forest Final Environmental Impact Statement (USDA Forest Service 2003) Appendix B-2: Terrestrial Wildlife Diversity and Viability.

For the Wasatch-Cache National Forest the term "species-at-risk includes:

- US Fish and Wildlife Service endangered, threatened, candidate, and proposed species.
- Regional Forester designated sensitive species.

Also considered for inclusion as species-at-risk were species identified by:

- The Nature Conservancy as having global rankings[1] of G1, G2, or G3;
- State Natural Heritage programs as having state rankings[1] of S1 or S2; and
- Partners in Flight as species of concern.

A more complete list of terrestrial vertebrate and invertebrate species at risk is available in the project file. Of the vertebrates, those that may occur within the allotment include those noted in Table F.1.

In some cases species may not be considered at-risk. Some species listed as S1 or S2 could be more appropriately addressed as species for which little is known of their distribution patterns or abundance. For these species, the emphasis would be to work with state and other governmental agencies to gather additional information relative to their rarity, habitat associations and other information.

Species that Possibly Occur

The *sage sparrow* was not included since it has not been observed in the project area (USFS surveys) and is listed only as an occasional spring visitor by the Bridgerland Audubon Society (1994). No observations of this species have occurred on UDWR transects and only one observation has occurred on the USFS transects within the Ogden and Logan Districts (Saddle Creek transect 2002). The *evening grosbeak* is listed as uncommon to rare by the Bridgerland Audubon Society (1994) and has not been observed during neotropical bird surveys conducted within the project area. No observations of this species have occurred on USFS transects within the Ogden and Logan Districts and only six observations have occurred on the UDWR transects (in 1997 on the Hardware Ranch Transect). The *Virginia warbler* is listed as uncommon to rare by the Bridgerland Audubon Society (1994) and has not been observed during neotropical

[1] See Glossary for definitions of Global and State Rankings.

bird surveys conducted within the analysis area. Only five observations of this species have occurred on USFS transects on the Ogden and Logan Districts and nine observations have occurred on UDWR transects (Ant Flat-Ogden Canyon and Hardware Ranch Transects). This species primary habitat, mountain brush only occurs in a small quantity within the project area. The *sandhill crane* tends to utilize low elevation riparian/wetland area and agricultural farmland. It has not been observed within the project area, but could use riparian areas during migration or during the breeding season.

The *Idaho pocket gopher* is one of three species in Utah and is currently known to occur only in Rich County and Daggett County. The species also occurs in parts of eastern Idaho, southwestern Montana, and western Wyoming. Idaho pocket gophers have been found at lower elevations within Rich county, but not on the Wasatch-Cache NF (Thaeler 1972). This pocket gopher's habitat is open sagebrush, grassland plains, pine forests, and subalpine mountain meadows. The *fringed myotis* distribution in Utah is only known by specimens from southern and east-central Utah (Hasenyager 1980). The fringed myotis inhabits caves, mines, and buildings, most often in desert and woodland areas. The *western red bat* is extremely rare in Utah, being known from only a few locations in the state. A verbal report by Brad Lengas and E. Owens documents a capture of this species in Cache County (Oliver 2000). The red bat is a solitary roosting species that tends to roost in trees which border forests, rivers, cultivated fields, and urban areas (e.g. streamside cottonwoods) (Harvey et al 1999). The *western small-footed myotis* can be found throughout most of Utah. The bat has been found to utilize Logan Cave as hibernacula, but in very small numbers (2-3 individuals) (USFS Cave Surveys). For the bat species addressed above, see the environmental consequences section for the Townsend's big-eared bat.

Species Unlikely to Occur

The *black swift* was not included, since its habitat areas for nesting are waterfalls and steep-faced canyons, which are not common in the project area, nor would this habitat be affected. Habitat for the *osprey*, lakes and large stream and rivers do not occur within the project area, nor have osprey been observed within the project area. The *Lewis' woodpecker* is listed as occasional (not occurring every year) by the Bridgerland Audubon Society (1994) and has not been observed during neotropical bird surveys conducted within the project area. No observations of this species have occurred on USFS transects within the Ogden and Logan Districts and only one observation has occurred on the UDWR transects (Red Spur Mountain Transect).

Species Not Present

The *sharp-tailed grouse* is not known to occur within the project area with the closest populations occurring within the foothills and benches of Cache County. The *rosy finch and dwarf shrew's* habitat, alpine, does not occur within the project area. The *gray catbird's* habitat, lowland riparian, does not occur within the project area. The *mountain plover's* habitat, high plains, does not occur within the project area and potential areas are located in eastern Utah and the eastern portion of the Wasatch-Cache National Forest. The UDWR Habitat Maps display the nearest *sage grouse* habitat (includes leks, winter, and yearlong habitat) just outside of and east of the project area (see project file).

Table F.1 Terrestrial vertebrates that may occur within the North Rich Allotment.

Species Common Name	Primary Habitat on Wasatch-Cache NF	Federal Ranking	Global Ranking	State (UT/WY) Ranking
Fringed myotis	Caves/Mountain shrub	None	G5	UT S2
Western small-footed myotis	Caves/Mountain shrub	None	G5	UT S2
Western red bat	Caves/Riparian	None	G5	UT S1
Evening grosbeak	Conifer/Aspen	None	G5	UT S2
Virginia's warbler	Mountain Shrub	None	G5	UT PIF WY S2B, SZN
Sage Sparrow	Sagebrush Steppe	None	G?	UT PIF WY PIF
Sandhill crane	Riparian	None	G5	UT S1
Idaho pocket gopher	Shallow rocky soils	None	G4	UT S1S2 WY S2?

[1] PIF – Partners in Flight

Species Present

The following vertebrate species are present within the allotment: broad-tailed hummingbird, Brewer's sparrow, Williamson sapsucker, and American pine marten. The broad-tailed hummingbird and Brewer's sparrow are addressed in Chapters 3.9 and 4.8 because of their priority status under Partners in Flight (PIF). Williamson sapsucker and American pine marten are discussed below.

Williamson's Sapsucker (*Sphyrapicus thyroideus*)

Williamson's sapsuckers occur in the Rocky Mountain States and the interior coastal ranges of the western U.S. This is an uncommon summer resident in Utah, but occurs throughout most mountainous areas in the State (Utah Division of Wildlife Resources 2001). It is found in Utah mainly in the mountainous areas of the eastern two-thirds of the state, where it is an uncommon breeder. This species has a G5 Global Heritage Status Rank, but an S2 ranking in the State of Utah (Natureserve 2001), where it is considered a sensitive species. The only known record within the analysis area is from a Forest Service Neotropical bird surveys conducted in 1998 on the Sinks Road transect. On its breeding grounds, the habitats used by this species are mid- to high-elevation coniferous forests and mixed deciduous-coniferous forests containing aspens. These habitats occur throughout the North Rich allotment. In general, threats to the sapsucker are from the loss of snags for cavities. The Bridgerland Audubon Society (1994) listed this species as uncommon.

American Pine Marten (*Martes americana)*
The American pine marten occurs in much of Alaska and Canada, and its range extends into several areas of the contiguous United States (Utah Division of Wildlife Resources 2001). Pine marten have been globally ranked as G5 and have been ranked in Utah as S2, (Natureserve 2001). On the Wasatch-Cache National Forest, this species currently occurs in the Uinta Mountains and an historic collection of a skull was made in 1963 near Beaver Mountain. American pine martens prefer forest habitat, where their dens can be found in logs, hollow trees, stumps, and rock crevices. These habitats occur within the North Rich Allotment. The diet of the American pine martin consists primarily of small mammals, although birds, insects, and fruits are occasionally consumed.

Terrestrial invertebrates present a unique situation; most survey work was very spotty and accomplished prior to 1950 and major questions exist regarding the classification and systematics of snail species and subspecies. None of the terrestrial snail species identified as species at risk have been found within the project area. Snail specimens have been collected within the project area for a northern Utah genetic study on mountainsnails. Of the snail specimens collected within the North Rich allotment area, all resemble *Oreohelix strigosa depressa, which* is common throughout the Wasatch-Cache National Forest. Additional information related to terrestrial snails is located within the project planning record.

Reptiles. Of the three reptile species reptiles included on the Species at Risk for Viability list in the Revised Forest Plan, only the rubber boa is likely to be found within the North Rich Allotment. They are associated with riparian areas.

Rubber boa *(Charina bottae).* The rubber boa frequents grassland, woodland, and forest habitats (Stebbins 1985). It can be found under rotting logs, rocks, and the bark of fallen and standing dead trees. Historically the species has been found scattered across the forest. Rubber boas have been observed at several sites in Logan Canyon. Based on the close proximity, number of sightings, and their secretive nature, rubber boas should be assumed to occupy portions of the North Rich Allotment.

Aquatic invertebrates. None of the aquatic invertebrate species identified on the species at risk for viability list in the Revised Forest Plan have been found within the project area.

Appendix G

Precipitation Data from Sites Near the North Rich Allotment

The following data is from the Western Regional Climate Center web page (http://www.wrcc.dri.edu/index.html) on August 29, 2003. It shows monthly precipitation for Laketown, Randolph, and Hardware Ranch climate data collection sites. Each area has varying amounts (years) of data, but each represents climate conditions for at least 20 years in areas near the allotment. These data show that nearly as many years are above average during the data collection period as below average. The associated graphs developed from these data exclude years with more than 5 days missing from more than one month.

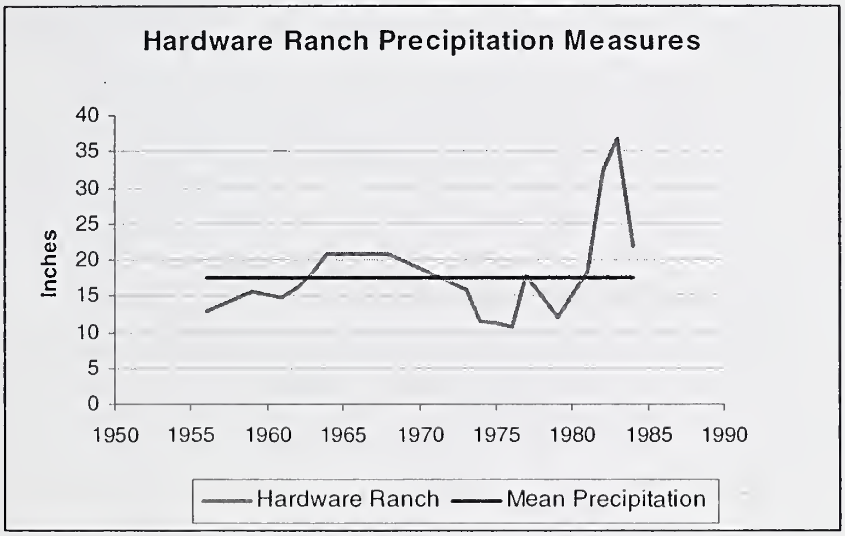
HARDWARE RANCH, UTAH
Monthly Total Precipitation (inches)
(423671)

File last updated on Aug 4, 2003
*** Note *** Provisional Data *** After Year/Month 199102
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1956	3.30	1.60	0.40	0.20	2.71	0.33	0.00	0.00	0.00	1.91	0.50	1.98	12.93
1957	1.80 t	0.90	0.71	2.76	3.21	1.66	0.41	0.64 c	0.40	0.87	1.31 b	1.66 d	14.53
1958	1.19 S	2.62	1.77	1.21	0.86	0.43	0.35	0.61	0.21	0.00	2.77	2.03	14.05
1959	0.89	2.34	1.65	0.78	1.60	1.21	0.24	2.41	2.91	0.80	0.00	0.84	15.67
1960	1.41	0.94	1.79	0.78	0.73	0.32	0.00 z	0.68	0.45	1.62	2.53	0.83	12.08
1961	0.00	1.75	1.32	1.13	0.73	0.95	0.30	2.72	1.86	1.18	0.80	2.00	14.74
1962	1.54	3.05	2.24	2.28	2.72	1.15	0.94	0.15	0.42	0.39	0.65	0.59	16.12
1963	2.63	2.02	1.39	3.69	0.60	1.58	0.00	1.18	2.13	0.99	1.38	0.75	18.34
1964	2.80	0.18	2.55	1.41	2.04	3.74	0.02	0.23	0.14	0.18	2.70	4.75	20.74
1965	2.71	1.25	0.40	1.29	1.17	1.52	0.00 z	2.08	2.08	0.00	3.05	1.37	16.92
1966	0.00 z	1.35	0.52	1.10	1.23	0.48	0.00	0.21	1.58	0.61	1.70	2.24	11.02
1967	2.56	1.15	2.49	4.48	1.99	3.55	0.19	0.10	0.40	0.00 z	1.09	1.96	19.96
1968	1.37	3.45	1.50	1.96	1.61	2.35	0.75	2.96	0.38	1.31	1.85	1.28	20.77
1969	2.90	2.12	0.32	1.60	0.21	3.20	0.33	0.27	0.37	0.00 z	0.42	2.03	13.77

YEAR(S)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1970	3.57	0.61	1.16	1.75	1.32	1.73	0.17 t	0.70	0.00 z	0.00 z	1.15 b	1.34 c	13.33
1971	0.75 a	0.62	0.67	0.00 z	0.08	0.001	0.00 z	2.31	0.00 z	0.00 z	0.40	0.00 z	4.83
1972	0.10 v	0.00 z	0.00 t	0.00 z	0.00 z	0.61 b	0.12	0.16	1.58	3.52	1.67	2.28	9.94
1973	1.19	1.13	1.12	1.33	0.29 b	1.35	2.02	0.49	2.54	0.53	2.31	1.64 b	15.94
1974	1.81	1.23	1.15	1.32	0.59	0.51	1.21	0.10	0.00	1.52	1.02	1.18	11.64
1975	1.83	1.08	1.24 d	1.22	0.52	0.82	0.67	0.76	0.08	1.87	0.71 d	0.30	11.10
1976	0.69 e	1.64	1.77	0.75	0.81	1.44	2.04	0.58	0.46	0.59	0.00	0.00	10.77
1977	1.04	1.10	1.12	0.13	4.25	0.05	0.36	2.40	1.26	1.40	1.28	3.39	17.78
1978	1.40	1.78	2.10	3.19	0.43 j	0.89	0.10	1.43	3.96	0.00	0.99	1.74	17.58
1979	1.78	1.06	1.09	0.21	1.35	0.18	0.07	0.69	0.00	3.34	1.75	0.54	12.06
1980	5.48 b	2.57	1.56	0.80	2.72	1.91	0.44	0.00 z	1.49	1.41	1.10	1.77	21.25
1981	1.12	0.53	2.29	1.08	3.48	0.50	0.39	0.04	0.69	4.02	1.42	2.91	18.47
1982	2.13 c	1.71	5.37 b	3.74	2.97	1.19	2.89	0.88	5.58	2.48	1.72 a	1.66	32.32
1983	1.19 c	1.29	3.11	3.43	4.17	1.59	2.04	4.17	1.88	3.84	3.81	6.29 b	36.81
1984	0.44	0.82	0.61 i	1.93 d	2.11	2.64	2.21	0.61	3.78 c	1.88	2.42	3.01	21.85
1985	0.43	1.34	2.26	0.05 s	2.52	0.81	1.41	0.00	2.69	1.19 m	1.34 t	0.29	11.75
1986	1.53 a	6.43	0.47	1.42 r	1.70	0.34	0.81	0.66	0.63 f	1.51	0.21 p	0.09	13.54
1987	0.93 d	0.48 b	0.66 a	0.40 c	2.50	0.46	1.97	1.76	0.44	1.26	0.55 g	0.20 g	10.86
1988	0.00 t	0.21	0.34 b	1.72 e	1.11	0.08 a	0.09	0.29 d	0.52	0.03	3.72 b	0.85	8.96
1989	0.93 a	0.84	2.93	1.15 b	1.07	1.57 b	0.13 a	0.63	1.88 i	1.04 b	1.38 b	0.17 a	11.84
1990	0.00 z	0.00 z	0.00 z	1.91 j	0.00 z	0.00 z	0.23	0.44 h	1.05 a	0.00 z	0.00 z	0.00 z	1.28
1991	0.00 z	0.26 m	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00

Period of Record Statistics													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MEAN	1.72	1.55	1.55	1.63	1.72	1.25	0.73	1.00	1.33	1.38	1.54	1.68	17.66
S.D.	1.14	1.17	1.05	1.13	1.14	0.97	0.82	1.03	1.37	1.14	0.99	1.34	7.13
SKEW	1.31	2.34	1.55	0.95	0.59	1.04	1.16	1.34	1.32	0.91	0.63	1.55	1.61
MAX	5.48	6.43	5.37	4.48	4.25	3.74	2.89	4.17	5.58	4.02	3.81	6.29	36.81
MIN	0.00	0.18	0.32	0.13	0.08	0.05	0.00	0.00	0.00	0.00	0.00	0.00	10.77
NO YRS	30	33	32	30	32	33	31	33	31	29	31	32	17



Only years missing 5 days or less data are used in this graph

LAKETOWN, UTAH
Monthly Total Precipitation (inches)
(424856)

File last updated on Aug 4, 2003
*** Note *** Provisional Data *** After Year/Month 200303
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not
sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

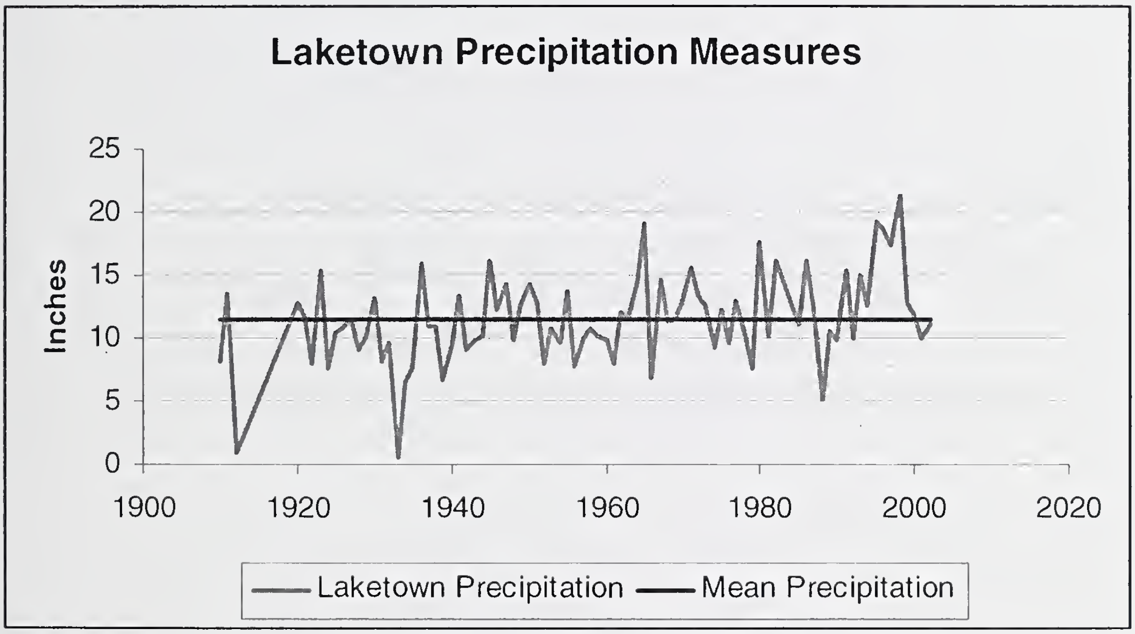
Years	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1910	1.50	0.75	0.53	1.10	0.00	0.00	0.50	0.15	0.45	1.35	0.75	1.15	8.23
1911	3.81	0.83	1.40	1.55	1.15	1.18	0.20	0.00	1.11	1.35	0.80	0.05	13.43
1912	0.60	0.30	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.90
1913	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1914	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1915	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1916	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1917	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1918	0.77	1.18	1.39	0.44	1.44	0.30	1.95	0.10	1.16	2.40	0.74 f	0.04 b	11.17
1919	0.02 m	0.84	0.62	1.35	0.80	0.00	0.70	0.20	1.89	3.81	0.72	0.84	11.77
1920	0.95	0.92	1.12	1.59	1.28	0.50	0.35	1.17	0.65	3.43	0.32	0.52	12.80
1921	0.92	0.73	0.83	1.95	0.79	0.37	0.36 a	1.52	0.15	1.21	0.78	2.01	11.62
1922	0.53	1.64	0.27	0.82	0.27	0.25	0.30	1.45	0.35	1.11	0.31	0.64	7.94
1923	1.24	0.05	0.52	2.70	2.00	1.21	0.73	0.90	2.05	2.88	0.03	1.14	15.45
1924	0.31	0.31	0.93	0.28	0.49	0.08	0.44	0.04	0.81	1.82	0.89	1.13	7.53
1925	0.10	0.45	0.89	1.11	1.76	0.80	0.34	0.83	1.68	1.57	0.63	0.22	10.38
1926	0.38	0.91	0.61	1.50	1.46	0.30	1.56	1.07	1.18	0.52	1.32	0.10	10.91
1927	0.55	1.11	0.78	1.37	1.05	0.66	0.45	0.26	2.03	1.39	1.24	0.51	11.40
1928	0.21	0.57	1.32	0.88	0.48	1.07	0.65	0.02	0.20	1.40	1.45	0.85	9.10
1929	1.13	0.36	1.59	1.44	0.14	0.38	0.13	1.06	1.98	1.10	0.24	0.44	9.99
1930	1.25	0.73	0.64	1.30	1.80	0.97	0.16	2.74	2.09	0.99	0.41	0.02	13.10
1931	0.06	0.27	0.93	0.28	1.45	0.06	1.11	0.61	0.68	1.15	0.66	0.97	8.23
1932	1.51	0.65	1.41	0.54	0.25	0.51	1.09	1.45	0.04	1.31	0.03	0.81	9.60
1933	0.48	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48
1934	0.34	1.07	0.44	0.46	0.41	0.44	0.47	0.71	0.28	0.50	0.88	0.52	6.52

Years	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1935	0.82	0.62	0.65	1.96	1.64	0.14	0.00	0.50	0.26	0.26	0.55	0.12	7.52
1936	1.50	3.04	1.33	0.37	0.56	1.27	1.93	2.06	0.83	2.08	0.35	0.60	15.92
1937	0.77	1.45	0.33	1.32	1.00	1.59	0.49	0.19	1.20	0.91	0.72	1.02	10.99
1938	0.41	0.45	2.54	1.46	1.82	0.52	0.37	0.43	0.50	0.77	0.91	0.78 a	10.96
1939	0.74	0.47	0.41	0.29	1.93	0.76	0.29	0.05	1.06	0.64	0.00	0.07	6.71
1940	0.63	0.84	0.54	0.71	0.48	0.33	0.37	1.04	1.93	0.99	1.05	0.60	9.51
1941	0.13	0.73	0.56	1.20	0.95	1.66	1.65	1.09	1.31	2.15	0.96	0.94	13.33
1942	0.72	0.72	0.46	1.00	0.79	0.39	0.11	0.60	0.80	1.53	1.58	0.42	9.12
1943	1.23	0.55	1.24	1.08	0.46	1.65	0.42	1.35	0.30	1.06	0.06	0.45	9.85
1944	0.61	0.33	1.52	2.31	0.66	2.23	0.26	0.00	0.69	0.12	1.09	0.36	10.18
1945	0.13	0.84	0.64	0.66	2.34	2.35	0.59	1.99	1.33	1.40	2.83	1.02	16.12
1946	0.08	0.38	2.09	0.91	1.26	0.24	0.38	1.23	0.71	3.15	0.72	1.14	12.29
1947	0.56	0.46	0.99	1.06	2.41	2.97	0.11	2.11	1.69	1.03	0.69	0.11	14.19
1948	0.71	0.85	0.76	2.42	0.24	1.16	0.07	0.11	0.37	0.64	1.53	0.98	9.84
1949	1.27	0.57	0.28	0.59	1.65	2.25	0.75	0.60	0.49	2.94	0.35	0.88	12.62
1950	3.34	0.50	0.87	1.24	2.32	1.03	0.85	0.10	1.34	0.80	0.90	0.97	14.26
1951	0.95	0.95	1.23	1.92	1.08	0.80	0.51	1.15	0.27	1.24	1.58	1.01	12.69
1952	0.72	1.18	1.06	0.31	1.18	1.31	0.30	0.86	0.27	0.00	0.41	0.40	8.00
1953	1.47	1.60	0.60	1.44	2.03	0.74	0.29	1.07	0.05	0.17	0.86	0.47	10.79
1954	1.64	0.35	0.78	0.13	0.84	0.98	0.20	0.41	0.70	1.14	1.19	1.32	9.68
1955	0.93	1.54	0.81	0.94	1.07	0.82	0.76	1.22	1.27	0.37	1.31	2.59 a	13.63
1956	1.46	0.44	0.20	0.48	1.91	0.49	0.35	0.43	0.03	0.57	0.07	1.30	7.73
1957	1.16	0.58	0.88	2.18	1.02	0.94	0.33	0.58	0.34	0.39	1.01	0.68	10.09
1958	0.44	0.84	1.05	0.36	1.32	0.96	0.30	1.40	0.43	0.05	2.44	1.10	10.69
1959	0.51	0.89	0.74	1.62	1.48	0.47	0.14	1.37	2.07	0.23	0.05	0.53	10.10
1960	1.10	1.43	0.82	0.45	0.15	0.61	0.19	0.22	1.38	1.91	1.21	0.31	9.78
1961	0.05	0.45	0.73	0.32	0.33	0.47	0.49	1.03	1.60	1.19	0.35	0.93	7.94
1962	0.68	1.87	1.50	1.76	1.47	0.82	0.83	0.24	0.40	1.25	0.67	0.49	11.98
1963	0.89	1.25	0.65	1.43	0.12	2.28	0.24	0.53	1.03	1.83	1.12	0.05	11.42
1964	0.42	0.10	0.80	2.01	1.21	2.14	0.38	0.03	0.41	0.07	1.46	5.36	14.39
1965	1.70	1.44	0.37	1.37	1.56	2.40	0.63	2.00	2.89	0.03	3.30	1.38	19.07
1966	0.58	0.49	0.40	0.68	0.62	0.30	0.09	0.20	0.99	0.34	0.59	1.49	6.77
1967	0.91	0.76	2.28	2.56	2.18	2.46	0.16	0.34	0.25	1.10	0.32	1.39	14.71
1968	0.46	0.86	0.71	1.06	1.63	1.38	0.76	1.81	0.13	0.58	0.63	1.24	11.25

Years	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1969	1.74	1.37	0.29	0.82	0.15	2.89	0.96	0.44	0.63	1.25	0.00	0.93	11.47
1970	0.99	0.26	0.63	0.94	1.18	0.89	0.04	0.04	1.22	1.71	3.60	1.32	12.82
1971	2.59	1.01	1.08	1.86	1.25	1.01	0.80	0.22	1.09	2.28	1.03	1.26	15.48
1972	2.31	0.45	0.83	2.74	0.00	2.03	0.34	0.42	0.55	1.69	0.80	1.26	13.42
1973	0.35	0.33	1.51	0.80	0.57	0.46	1.58	0.68	2.88	0.56	1.22	1.69	12.63
1974	1.29	0.74	0.99	1.22	0.47	0.30	0.92	0.16	0.03	2.05	0.44	0.66	9.27
1975	1.11	0.52	1.49	0.54	0.87	2.76	0.79	0.20	0.08	2.24	1.01	0.63	12.24
1976	0.54	1.96	1.70	0.86	1.01	0.59	1.21	1.08	0.53	0.09	0.00	0.00	9.57
1977	0.31	0.39	0.91	0.00	2.20	0.88	0.85	3.36	0.61	0.64	1.12	1.74	13.01
1978	0.45	0.97	0.31	1.02	0.91	0.44	0.35	0.73	1.80	0.00	1.04	2.10	10.12
1979	1.49	0.45	0.52	0.00	0.86	0.11	0.16	1.42	0.11	1.78	0.47	0.19	7.56
1980	3.58	0.85	0.84	1.55	3.16	1.73	1.00	0.70	1.09	1.37	1.00	0.80	17.67
1981	0.37	0.16	0.79	0.32	1.11	0.65	0.79	0.16	0.55	2.77	0.93	1.67	10.27
1982	1.37	1.01	1.33	1.25	1.46	0.31	1.83	0.98	4.65	0.37	1.10	0.44	16.10
1983	0.15	0.40	0.93	1.65	2.66 a	0.59	1.36	5.13	2.71	1.76	0.00 z	2.60 b	19.94
1984	0.18 a	0.14	0.34	1.12	0.41	0.91	1.15 a	0.31	2.56	0.88 d	1.56 b	1.05 c	10.61
1985	0.28 a	0.63 a	1.53	0.25	0.85	0.30	1.24	0.00	1.81	0.95	2.23	1.06	11.13
1986	0.59	4.25	1.93	2.55 a	1.22	0.60	0.67	0.38	2.11	1.44	0.41	0.00	16.15
1987	0.88	0.42	1.34	0.00 a	3.08	0.52	1.28	1.15	0.18	1.60	1.17	0.89	12.51
1988	0.41	0.15	0.54	1.01	0.55	0.66	0.00	0.14	0.26	0.00	1.26	0.13	5.11
1989	0.41	1.15	1.66	1.38	1.43	1.10	0.17	0.40	0.97	0.63	0.51	0.73	10.54
1990	0.89	0.53	0.39	1.32	0.90	1.23	0.19	0.38	1.11	0.76	1.51	0.67	9.88
1991	0.22	0.00 a	0.95	1.35	2.76	2.31	0.94	1.07	1.81	1.83	1.88	0.28	15.40
1992	0.69	0.26	0.25	0.94	0.99	0.63	1.16	0.67	0.44	1.80	0.98	1.12 a	9.93
1993	1.56	0.87	1.19	1.85 a	1.77	1.25 a	2.22	1.16	0.15	1.50	0.88	0.53	14.93
1994	0.53 a	1.23	2.08	1.32	0.69	0.00	0.03	0.58	0.61	2.03	2.48	0.98	12.56
1995	0.73	1.53	2.94	1.75	2.60	3.01 a	1.28	0.59	1.08	0.94	0.73	2.07	19.25
1996	1.88 a	1.45	1.28	1.21	2.72	0.21	0.79	0.00	1.00	1.71	2.84	3.48	18.57
1997	1.82	0.45	0.67	2.79	1.61	1.62	1.19	1.45	2.74	0.88	1.41 a	0.84	17.47
1998	2.08 a	1.77	1.83	1.46	1.89	4.21	0.61	2.35	1.37	2.72	0.32	0.61	21.22
1999	1.56	2.01 a	0.96	3.70	1.59	0.89	0.27	0.51	0.70	0.07	0.18	0.41	12.85
2000	1.53	1.20	1.02	0.50	1.72	0.08	0.25	1.33	1.16	0.88	1.44	0.79	11.90
2001	0.36 b	1.13	0.56	1.12	0.60	0.42	0.90	0.09	0.02	0.61	2.49	1.74 a	10.04
2002	1.27	0.20	0.86	1.88	0.40	0.23	1.41	0.15	1.58	1.56 a	1.25	0.41	11.20

Years	JAN	FEB		MAR	APR	MAY	JUN		JUL	AUG		SEP		OCT		NOV		DEC		ANN
2003	0.23	1.48	a	1.45	0.62	3.18	0.57	c	0.04	0.00	z	0.00	z	0.00	z	0.00	z	0.04	z	7.57

Period of Record Statistics													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MEAN	0.94	0.85	0.95	1.17	1.21	0.97	0.63	0.81	1.00	1.20	0.97	0.90	11.47
S.D.	0.74	0.64	0.55	0.74	0.79	0.85	0.51	0.83	0.85	0.85	0.75	0.80	3.57
SKEW	1.67	2.23	1.02	0.68	0.56	1.35	1.02	2.23	1.34	0.71	1.28	2.53	-0.05
MAX	3.81	4.25	2.94	3.70	3.18	4.21	2.22	5.13	4.65	3.81	3.60	5.36	21.22
MIN	0.05	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.48



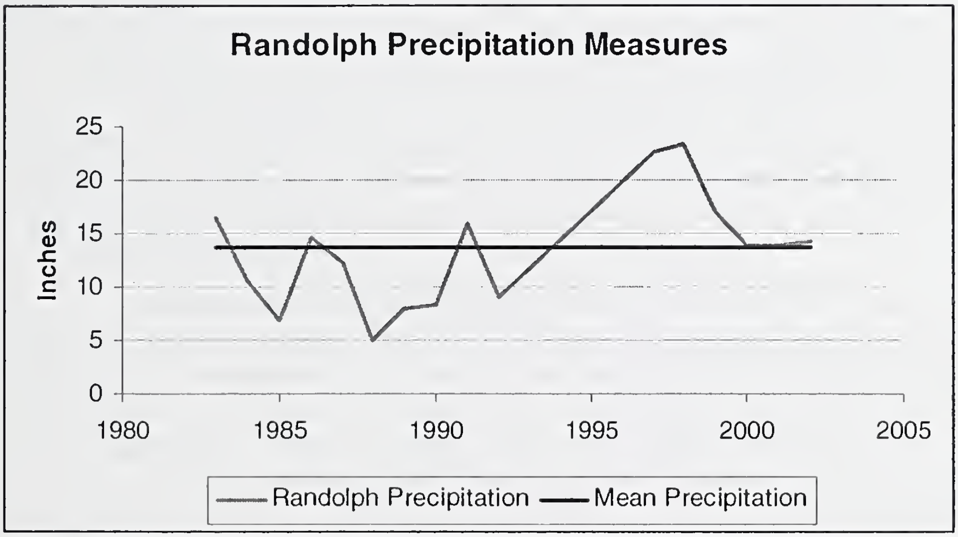
Only years missing 5 days or less data are used in this graph

RANDOLPH, UTAH
Monthly Total Precipitation (inches)
(427165)

File last updated on Aug 4, 2003
*** Note *** Provisional Data *** After Year/Month 200303
a = 1 day missing, b = 2 days missing, c = 3 days, ..etc..,
z = 26 or more days missing, A = Accumulations present
Long-term means based on columns; thus, the monthly row may not
sum (or average) to the long-term annual value.
MAXIMUM ALLOWABLE NUMBER OF MISSING DAYS : 5
Individual Months not used for annual or monthly statistics if more than 5 days are missing.
Individual Years not used for annual statistics if any month in that year has more than 5 days missing.

Years	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANN
1982	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	1.33	1.59	4.55	0.39	1.09	0.57	9.52
1983	0.14	0.35	1.21 e	1.31	2.22	0.80	0.89	2.63	2.41	1.45	1.51 a	1.50	16.42
1984	0.11	0.27	0.31 e	0.81 a	0.78 a	0.75	1.80	1.24	1.75	0.97	1.48	0.32	10.59
1985	0.30	0.33	0.45	0.41	1.13	0.13	0.88	0.06	1.66	0.67	1.43 l	0.74 d	6.76
1986	0.24	3.06	0.85	2.26	0.95	1.05	0.85	1.12	2.19	1.56	0.30	0.11 a	14.54
1987	0.39	0.25	1.14	0.10	3.79	0.44	1.28	1.29 a	0.30	1.16	1.39	0.62	12.15
1988	0.46	0.04	0.68 a	0.98	0.77	0.33	0.06	0.15	0.33	0.03	0.94	0.23	5.00
1989	0.10	0.86	0.91	0.81	1.05	0.81	0.46	0.23	1.64	0.46	0.20	0.39	7.92
1990	0.47	0.31	0.24	1.23	0.85	1.05	0.28	0.39	1.88	0.42	0.84	0.30 a	8.26
1991	0.07	0.00	0.62	1.36	3.12	2.48	0.52	2.25	1.91	1.90	1.72 e	0.06 c	16.01
1992	0.53	0.23 d	0.08	0.45	1.51	0.52	1.32	0.37	0.49	1.57	1.16	0.77	9.00
1993	0.00 z	0.00 z	0.59	1.05 j	1.72	1.35 l	1.52 a	2.05	0.22	1.65 a	0.00 z	0.00 z	7.75
1994	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1995	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00
1996	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.55	0.76	0.64	0.79	1.09	1.85	2.70 c	8.38
1997	2.15	0.83	0.67	3.50	1.46	1.97	2.06	2.27	3.80	1.01	1.46	1.34	22.52
1998	2.06 a	2.22	2.71	0.60	2.56	5.16	1.60 a	1.70	1.02	2.45	0.63	0.71	23.42
1999	1.53	2.65	0.64	2.70	2.13	2.32	1.07	1.48	1.40	0.11	0.32	0.63	16.98
2000	1.99	1.04	0.89	1.07	2.01	0.54	0.33	0.00 z	2.24	1.41	1.01	1.31	13.84
2001	0.49	2.21	0.75	1.89	1.00	0.46	1.05	0.64	0.66	0.72	2.17	1.86	13.90
2002	0.92	0.50	1.39	1.96	1.67	0.03	2.91	0.07	1.30	2.03	1.03	0.41	14.22
2003	0.30 a	1.63	1.22	0.53	1.94	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	0.00 z	5.62

Period of Record Statistics													
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
MEAN	0.72	0.99	0.85	1.29	1.70	1.14	1.10	1.12	1.61	1.11	1.12	0.81	13.64
S.D.	0.73	0.99	0.58	0.91	0.84	1.26	0.69	0.84	1.15	0.67	0.56	0.69	5.33
SKEW	1.09	0.91	1.75	0.94	0.94	2.10	0.80	0.26	1.03	0.14	-0.04	1.33	0.31
MAX	2.15	3.06	2.71	3.50	3.79	5.16	2.91	2.63	4.55	2.45	2.17	2.70	23.42
MIN	0.07	0.00	0.08	0.10	0.77	0.03	0.06	0.06	0.22	0.03	0.20	0.06	5.00



Only years missing 5 days or less data are used in this graph

Appendix H

THE SCOPE OF FINANCIAL EFFICIENCY ANALYSIS OF FOREST SERVICE GRAZING PROGRAMS IN R-4

Prepared by Terry Padilla

Program Management, NEPA, and Appeals Coordinator

Intermountain Region (R-4)

The economic efficiency of livestock grazing on National Forest System Lands is a recurrent issue raised by many public interests to Forest Service proposals to authorize continued grazing use. In particular, these issues argue the point that positive financial efficiency – measured by standard economic evaluation criteria, including PNV [Present Net Value], B/C [Benefit/Cost], and IRR [Internal Rate of Return], should be a primary consideration toward future Forest Service grazing authorization. In essence, many Forest stakeholders interested in Forest Service grazing projects argue that agency grazing programs should demonstrate the ability to "pay their way" as a condition to issuance of term grazing permit.

While financial integrity and accountability of all resource management programs in the Forest Service is a program management priority, the Forest Service, like the Bureau of Land Management, is constrained in its ability to positively affect the financial efficiency of agency grazing projects. Primary factors include: Constraints from Congress on the Forest Service grazing fee; inability of the agency to control permittee ranching operations and profit margins; and the impact of climatic influences on grazing seasons and stocking rates directly affect annual grazing receipts. In addition, realization of estimated economic returns from the construction of range improvements tied to allotment grazing programs are speculative, subjective to measure, and subject to climatic fluctuations in grazing seasons.

Grazing fees for permitted livestock use on National Forest Systems lands are designated by Congress in accordance direction incorporated in FLPMA, Sect. 401, and 36 CFR 222.10(a). Under this regulation Currently 100 percent of Forest Service fees are returned to regions and Forests from which they are generated to be use for range betterment on the agency allotments from which they were generated. However, under this same regulations, up to one-half per centum of these receipts could be allocated to the U.S. treasury, and not returned to the Forest Service.

In addition to their influence on the allocation to grazing receipts that can be appropriated to the Forest Service, these same regulations place a limit on the fee the Forest Service can charge for livestock grazing on National Forest System lands. In accordance with these regulations, all federal grazing fees are established through an approved formula. As a result, because the Forest Service is limited in its ability to affect financial returns by increasing grazing fees, and subject to fluctuations in return of grazing receipts based on Congressional determination, it is limited in its ability to create a positive financial return as measured by traditional economic criteria. Moreover, under any measure of financial efficiency associated with grazing proposals, economic benefits and costs

associated with livestock market values and operator expenses would be required factors in the comprehensive financial evaluation of the ten-year grazing program relative to Forest Service permit authorizations. The Forest Service has no direct influence on annual sale value of livestock or permittee operating costs[1] that limit management abilities on National Forests.

With the passage of the 1995 Rescission Act, Congress has directed the Forest Service to issue grazing permits on active allotments pending updated AMP development in accordance with NEPA. In accordance with this direction, all grazing permits affected by the Rescissions Act have already been previously issued. In addition, under NEPA, economic adversity may not necessarily be considered a significant impact when weighed in the balance of outputs and effects for the entire project [authorized activity]. No Forest Service direction or other federal law constrain grazing authorization based on financial or economic efficiency.

Under current Forest Service policy, the socio-economic impacts of Forest Grazing Programs are analyzed at the Forest Plan level through an FEIS. Agency analysis of site-specific grazing authorizations which implement the Forest Plan disclose predicted annual grazing revenues generated through proposed grazing authorizations, identify expected impacts from grazing authorization where alternative standards are not met[2], and disclose the economic and environmental benefits of implementing range improvements where these outputs and impacts can be responsibly [reasonably] estimated.

Based on the constraints of federal laws and regulation toward affecting the financial efficiency of the Forest Service grazing program, together with Congressional direction to authorize grazing in accordance with NEPA, financial efficiency as a condition for grazing authorization is considered [has been determined to be] outside the scope of Forest Service grazing projects.

The following footnotes are from ID team members, rather than from Terry Padilla

---

[1] While the Forest Service has some influence on permittee operating costs (annual maintenance requirements, structural improvements, etc.), it has no direct influence on the annual sale value of livestock.

[2] Appendix K outlines the administration process if terms and conditions of permits are not followed.

Appendix I

Annual and Long-term Trend Monitoring for the North Rich Allotment

The following information was adapted from annual and long-term trend monitoring tables included in the Rangeland Health Environmental Impact Statement Record of Decision (USDA Forest Service 1996).

Annual Monitoring: "Annual" monitoring is conducted each year, throughout the grazing season rather than once a year, to determine whether or not proper use is being reached. For any key area monitored, livestock should be removed as soon as any of the determined use levels are reached. For example, if agreed-upon greenline stubble height is reached while utilization on uplands or adjacent riparian areas is less than maximum allowable levels, livestock would be removed; conversely, if use on uplands and/or riparian areas reaches maximum levels while the stubble height remains greater than allowable use levels, livestock would be removed. In addition, if annual streambank trampling reaches levels identified then livestock will be removed or actions will be taken to remove other human impacts. Annual utilization monitoring is not to be confused with trend monitoring; it is merely an annual predictor of proper use. As conditions move from unsatisfactory to satisfactory, annual utilization levels may be increased to those maximum levels allowed in this EIS. Conversely, if conditions move from satisfactory to unsatisfactory, adjustments may be necessary to reduce annual impacts to the rangeland resource.

MIH Reference Code	Activity, Practice or Effect to be Measured	Expected Monitoring Technique	Precision/ Reliability	Measurement Frequency	Reporting Period	Variation Which Would Cause Further Evaluation and/or Change in Management Direction
D07	Greenline	Stubble Height	M-H	Annual on at least 10% of key areas	Annual	Not moving toward DFC after 5 years of implementation of standard
D07	Measurement of forage utilization in uplands, aspen, and riparian ecosystems	Key species utilization, percent of total annual growth.	M-L	Annual on at least 10% of key areas	Annual	Not moving toward DFC after 10 years of implementation of standard

Long-Term Trend Monitoring: Permanent benchmark plots should be established in areas to assess rangeland ecosystem conditions and to monitor changes in species composition, ground cover, and stream channel conditions as a result of management activities. These plots should be reread at 10-year intervals as a minimum to assess trends over time.

MIH Ref Code	Activity, Practice or Effect to be Measured	Expected Monitoring Techniques	Precision/ Reliability	Measurement Frequency	Reporting Period	Variation Which Would Cause Further Evaluation and/or Change in Management Direction
D07	Riparian Ecological Status	Riparian Evaluation Guide (R4 1994) Cross Section Composition and Level 2, Inventory	M-H	5 years on Key Riparian Areas	10 years	Decrease in ecological status or less than 5 percent (absolute) improvement for areas in unsatisfactory condition.
D07	Riparian Greenline Status	Riparian Evaluation Guide (R4 1994) Cross-Section Composition	M-H	5 years on Key Riparian Areas	5 years	Decrease in ecological status or less than 10 percent (absolute) improvement for areas in unsatisfactory condition.
D07	Upland Sagebrush and Aspen, Ground Cover	Nested Frequency Ground Cover and Rapid Assessment Ground Cover	H	5-year	10 years	Downward trend in ground cover or less than 10 percent (relative) improvement in ground cover for areas in unsatisfactory condition.
D07	Upland/ Aspen Species Composition	Nested Frequency	H	5-year	10 years	Upward trend in dominance of undesirable plant species.
D07	Shrub Cover/Age Class Diversity	Line Intercept/ Age Class Measurements	H	5-year	10 years	Downward trend in shrub cover an/or age class diversity of desirable browse species

Appendix J

Actions Considered in the Cumulative Effects Analysis

The National Environmental Policy Act and CEQ regulations for implementing NEPA direct federal agencies to consider cumulative effects to proposed actions. The regulations at CFR 40 1508.7 define cumulative effects as "the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonable foreseeable actions, regardless of what agency or person undertakes them." The range of alternatives considered must include the no-action alternative as a baseline against which cumulative effects are evaluated. Cumulative effects result from spatial (geographic) and temporal (timing) crowding of environmental perturbations. The effects of human activities will accumulate when a second perturbation occurs at a site before the ecosystem can fully rebound from the effect of the first perturbation (CEQ, 1997).

Table J-1 shows the past and reasonably foreseeable future actions considered in the cumulative effects analysis as identified from District records by interdisciplinary team members and discussed in each of the resource sections in Chapter 4. The actions are summarized below and described in more detail in Chapter 4.

Table J-1. Actions Considered in the Cumulative Effects Analysis

Action	Fish	Heritage	Recreation	Vegetation	Water/ Soil	Wildlife
Historic Livestock Grazing	X	X	X	X	X	X
Historic Timber Harvest	X	X	X	X	X	X
Wildfires in Edgar Canyon and Spawn Ck	X	X		X	X	X
Wildlife Prescribed Burns	X	X		X	X	X
Travel Plan Implementation	X	X	X	X	X	X
Hells Hollow Riparian Fence	X				X	X
Treatments for Noxious Weeds					X	
Bear Hodges II, Timber Sale	X	X	X	X	X	X
Travel Plan Revision	X	X	X	X	X	X
ATV Trail	X	X	X	X	X	X
Riparian Improvement Projects	X	X			X	X
Insects and Disease				X		
Small Nepa Projects*	X	X	X	X	X	X

* Scoping letters proposing several small projects on the Logan Ranger District were mailed to district mailing list members on March 20, 2003, June 10, 2003, and November 7, 2003. The proposed projects included actions of limited extent such as trail maintenance, mountain bike races, campground water system improvements, campground restroom replacements, and riparian fencing. These are small projects for which documentation in an environmental assessment (EA) or environmental impact statement (EIS) is typically not required. For these projects of limited scope, an analysis is completed and a decision is documented in a Decision Memo. The North Rich interdiciplinary team reviewed the list of proposed projects and only the Riparian Fencing Project at Tin Cup, Mill Hollow, Jebo, Saddle Creek and Bubble Spring were determined to be within the North Rich Allotment cumulative effects area of influence. This riparian improvement project is discussed in the relevant resource environmental consequences sections, under cumulative effects. The list of proposed small projects the team reviewed is available in the North Rich project file.

Past Actions:

Range

Livestock grazing, since mid-1800s

Willow Springs Sheep Allotment was incorporated into North Rich Allotment in 1971 (area in the southern portion of the allotment)

Adjacent allotments (sheep and cattle)

Treatment for Noxious Weeds (about 50 acres per year)

Hells Hollow Riparian Fence (1994)

Timber

Historic timber harvest (1970-1999; see Table 4.1)

Slideout Timber Sale (1996-1999)

Bear Hodges Timber Sale (1999-2002)

Fire

Edgar Fire (1994); eastern edge of the allotment

Spawn Creek Fire (1988); adjacent to allotment, directly to the west

Historic suppression of natural and man-caused fires

Wildlife Prescribed Burns

Red Banks Prescribed Burn (1997)

Boulder Mountain Prescribed Burn (1999 and 2003)

Rock Creek Prescribed Burn (Ogden District, 1999)

Travel Plan

The Travel Plan for the Logan District was approved in 1991 and revised in 1997. Implementation of the provisions in the plan continues. Decommissioning of roads designated as closed in the Travel Plan will continue to take place through road obliteration, seeding, and signing.

Recreation

Unauthorized use of roads and trails (closed and/or ghost roads). Disrespectful, illegal, and unauthorized use of ATVs (such as riding on closed trails or roads) occurs on the Logan Ranger District. However, decisions regarding ATV use and enforcement of the Travel Plan are not made within the scope of the North Rich EIS and ROD.

Present Actions:

See Affected Environment, Chapter 3

Reasonably Foreseeable Future Actions:

Range

Adjacent allotments (sheep and cattle)

Treatment for Noxious Weeds (about 50 acres per year)

Timber

Bear Hodges II Timber Sale (formerly referred to as the X-4 Timber Sale); spruce thinning and regeneration on the Daniel Experimental Forest; DEIS released December 2003; FEIS expected to be completed in 2004.

Travel Plan

The Travel Plan will be revised beginning within the next 5 years.

Recreation

An ATV trail system which would traverse the Logan District has been proposed. The system would not open new routes, but would include additional signing of existing trails and roads.

Riparian Improvements

Riparian improvement projects include exclosures scheduled for Tin Cup, Mill Hollow, and Jebo, Saddle Creek, and Bubble Spring riparian areas (under a Decision Memo signed by Ranger Robert Cruz on June 2, 2003. Of these five riparian areas, only Tin Cup, Mill Hollow, and Jebo are within the North Rich Allotment. The Saddle Creek project is directly south of the allotment. Bubble Spring is about six miles west of the allotment. The riparian improvement projects include fences, pipelines and troughs (to provide water to livestock away from riparian areas). Tin Cup (fence with trough and pipeline) and Saddle Creek (fence only) were completed in 2003. The others are planned for completion in 2004.

Appendix K

GRAZING PERMIT ADMINISTRATION HANDBOOK[1]
CHAPTER 10- PERMITS WITH TERM STATUS
Section 16

The following is included in R4 (Intermountain Region) Interim Directive Forest Service Handbook 2209.13 GRAZING PERMIT ADMINISTRATION HANDBOOK CHAPTER 10- PERMITS WITH TERM STATUS, effective January 20, 2004

16.2 - Suspension or Cancellation of Grazing Permits Due to Noncompliance with Permit Terms and Conditions

Grazing permits are subject to administrative actions such as partial or total suspension or cancellation for violations of terms and conditions of the permit, which are found in Parts 1, 2 and 3 of the grazing permit with term status and set forth at 36 C.F.R. 222.4. Suspensions are the temporary withholding of some or all of a permit holder's grazing privileges. Cancellations are the permanent invalidation of some or all of a permit holder's grazing privileges. Suspensions and cancellations can apply to permitted livestock numbers, seasons of use, or grazing allotments.

Where permittee actions violate permit terms and conditions, a suspension of grazing permit privileges may be an appropriate tool that might improve future compliance with permit terms and conditions. However, it is not necessary for a term grazing permit to be suspended first before it can be cancelled. Under no circumstances should a temporary permit be issued to restore reductions resulting from suspensions or cancellations.

Since a term grazing permit with multiple allotments represents a consolidation of multiple permits for administrative efficiency, suspensions or cancellations resulting from the noncompliance with permit terms and conditions should only apply to the allotments where the noncompliance occurred. Sanctions should only be applied "across-the-board" in those instances where the violation cannot be isolated to a particular allotment or allotments.

16.3 - Notice of Non-Compliance

Where noncompliance with permit terms and conditions has occurred that may warrant administrative action such as partial or total suspension or cancellation of grazing privileges, the authorized officer must issue a Notice of Noncompliance (NONC) to the permittee before initiating proceedings except where the permittee's conduct was willful

[1] Forest Service Handbook (FSH 2209.13, Chapter 10, Section 16)

or where immediate action is necessary to protect public health, interest, or safety. Show cause letters shall no longer to be issued for this purpose.

When infrequent, minor, or first time offenses have been detected that can be easily remedied by a telephone call to or personal contact with the permittee and the violation is one that would not ordinarily justify suspension or cancellation action, issuance of a NONC is not necessary. However, the authorized officer should make contact with the permittee, describe the noncompliance incident, the corrective action required, the timeframe, and the consequences associated with failure to act. The noncompliance incident and the follow-up discussion with the permittee should be documented in the allotment inspection notes or a memorandum and placed in the permittee's official case file

16.31 – Contents of Notice of Noncompliance

A NONC must include the following:

- i) a specific description of the permit violation(s);
- ii) the corrective action that must be taken by the permittee to demonstrate or achieve compliance with the grazing permit;
- iii) the timeframe within which the permittee must take the corrective action; and
- iv) a warning that administrative actions may be initiated against their term grazing privilege if the permittee fails to take the specified corrective action within the prescribed timeframe.

As a courtesy, the NONC should also include a statement that encourages the permittee to contact the authorized officer at their earliest convenience if they believe that the NONC has been sent in error.

Because this is a "notice" rather than a "decision" regarding the administration of a term grazing permit, it is not appealable under 36 CFR 251 and appeal rights language must not be included in the NONC. However, the NONC may include a statement of the authorized officer's willingness to meet and discuss the NONC if the permittee believes that an error has been made. In the event the permittee and the authorized officer cannot work out their differences after a meeting and the permittee refuses to take the corrective action outlined in the NONC, the authorized officer would issue a decision to initiate suspension or cancellation proceedings. This decision would be subject to appeal under 36 CFR 251, Subpart C. See exhibit 01- Notice of Non-Compliance Formats for examples of both Notice of Non-Compliance and Decision Letter formats.

16.32 - Time to Demonstrate or Achieve Compliance

The time to demonstrate or achieve compliance must be reasonable and must be determined by the authorized officer on a case-by-case basis. In many instances, what is deemed "reasonable" may depend upon the nature of the noncompliance, the location of the noncompliance, and, even perhaps, the time of year when the noncompliance was detected.

16.33 - Permittee Actions to Demonstrate or Achieve Compliance

In situations where the noncompliance is ongoing, the corrective action is straightforward – the noncompliance must cease within the prescribed timeframe. For example, if a permittee is currently grazing more livestock than authorized by the permit, the notice letter would direct the permittee to remove the excess livestock.

Where, however, permit noncompliance has ceased, for example, monitoring at the end of the grazing season following the removal of livestock indicates forage utilization standards have been exceeded; the corrective action is more complicated. In this case, the Notice should describe with particularity the permit provision that was violated and explain that strict compliance with that provision will be required during the upcoming grazing season or else suspension or cancellation proceedings will be initiated.

16.34 - Forest Service Verification and Documentation of Compliance

As soon as reasonably practicable after the time period specified in the Notice of Noncompliance (NONC) has expired, the authorized officer must inspect or otherwise determine whether the permittee has taken the appropriate corrective action necessary to demonstrate or achieve compliance or whether the permittee has failed in this regard. This determination shall be sent.to the permittee preferably using certified mail, but in the instance that the permittee will not accept certified mail, either in regular mail or hand delivered.

In those instances where the permittee has failed to take the required corrective action within the prescribed timeframe, the letter will state that administrative action such as suspension or cancellation of a portion or the entire permit is being initiated. The letter should describe the type and extent of the permit action being taken and should notify the permittee of his/her right to seek mediation in those states where mediation is available (sec. 16.4) and administrative appeal of the decision under 36 Code of Federal Regulation 251.80.

16.35 - Willfulness and Public Health, Interest, and Safety Exceptions

A NONC is not required in cases involving willful conduct by the permittee which might include, for example, intentional concealment or misrepresentation of pertinent information like ownership of base property or livestock.

Nor is a NONC required where the violation has an immediate and adverse affect on public health, interest, or safety and prompt action is necessary to avert the threat.

In those instances when a determination is made to institute permit suspension or cancellation proceedings without first sending a NONC, the authorized officer must document the rationale for this decision in the letter instituting the proceedings. It may be advisable to consult with the regional range management specialist or with an attorney in the Office of the General Counsel before making a determination regarding issuance of a notice of non-compliance letter. Though not required under these circumstances,

nothing precludes the issuance of a NONC either. This may be a reasonable course of action particularly in those instances where determinations of willfulness or threats to public health, interest, or safety are not clear-cut.

16.36 - Repeated Incidents of Noncompliance

The purpose of the NONC is to provide a permittee with notice of problems associated with permitted livestock grazing activities and a reasonable opportunity to fix the problems before administrative actions such as suspension or cancellation are undertaken. In other words, except in situations involving willfulness or public health, interest, or safety (sec. 16.35 above), permittees are given a "second chance" to correct a violation of permit terms and conditions.

While they may be entitled to a "second chance," permittees are not entitled to unlimited chances to correct repeated incidents of noncompliance regarding the same or a closely-related permit terms or conditions. Such an approach could lead to a never-ending cycle of permittee violation, Forest Service issuance of NONC, permittee corrective action, Forest Service verification, followed by another violation of the same term or condition by the permittee, and so forth. Rather than issuing multiple Notices for repeated violations of the same permit term or condition in the same season or at the end of an authorized grazing season, the authorized officer should issue one notice for the up coming 12 month period and then initiate suspension or cancellation proceedings if the same violation arises at a later date.

However, in cases involving the violation of different, that is, unrelated permit terms in different grazing seasons, the authorized officer should issue a new NONC letter for the second violation rather than relying on a previous notice of non-compliance letter for an earlier violation unrelated to the most recent violation. In other words, if the permittee violates a different term and condition than the one referenced in the first Notice, the authorized officer should issue another Notice to address this new violation.

16.4 - Suspension and Cancellation Sanction Guidelines

Forests may not supplement the following guidance for consistent actions in grazing permit administration for the categories listed. The objectives are:

1. To obtain consistency on administrative actions taken on non-conformance with the terms and conditions of the term grazing permit.

2. To ensure consistency with recent Court decisions (Anchustegui) and guidance;

3. To provide a firm but fair approach.

If non-conformance with the permit terms and conditions occurs, these guidelines provide recommended actions deemed appropriate, while recognizing that situations and

circumstances can vary. These guidelines are not all inclusive of potential situations. Direct questions to regional rangeland management specialists.

Non-compliance with the term grazing permit terms and conditions are generally cumulative. This means that any and all recent prior occurrences of non-compliance with permit terms and conditions should be considered in determining second and third offenses. Permit non-compliance instances in year 1 should be considered in actions taken on non-compliance situations occurring in year 2 or 3. However, do not consider an isolated non-compliance situation that occurred a number of years previous as evidence of a recurrent history of violations.

In addition to cancellation or suspension action, require the permittee to pay the unauthorized use rate for excess use where appropriate. Excess use is grazing livestock in greater numbers or at times or places other than authorized by the permit or the bill for collection.

For many situations of non-compliance, the letter of non-compliance should contain an offer from the authorized officer to hear the permittee's viewpoint. This opportunity for the permittee to be heard may take the form of a written letter or a personal meeting between the permittee and the authorized officer.

Follow guidelines below for determining the extent of suspensions and cancellations unless the authorized officer determines a different action is appropriate due to the specific circumstances of the violation.

1. Excess Use. Any livestock owned by the holder of a National Forest System grazing permit, but grazing on National Forest System lands in greater numbers, at times, or in places other than permitted in Part 1 of the grazing permit or authorized on the annual Bill for Collection, including any modifications made by the authorized officer, constitutes excess use. Failure to remove livestock at the end of the grazing season or when instructed by the authorized officer is excess use. Grazing Permit, Part 2, Section 8(c), 8(d), and 8(e).

a. Notice of Noncompliance and Opportunity to Remedy. Contact the permittee by phone or in person to notify them of the non-compliance, specifying what parts of the Term Permit, AMP and/or AOI are in non-compliance; and, require livestock removal in full within 72 hours. Send a letter documenting the verbal discussion, including what parts of the Term Permit, AMP and/or AOI are in noncompliance, what action is expected of the permittee to remedy the situation, to what standard, and by when. Bill for excess use at the unauthorized use rate.

b. Permit Action Decision Letter for Noncompliance. When documented inspection indicates that excess use has occurred for a second time, or if the initial non-compliance has not been remedied as specified, notify the permittee with a notice of permit action in a decision letter, by Certified Delivery – Return Receipt Requested, suspending 25 percent or more of the permitted numbers or seasons for a period of at least two years. Bill for excess use at the unauthorized use rate.

c. Repeat Offenses. When documented inspection indicates that excess use has occurred under repeat situations and/or the previous situations have not been remedied as specified, send a notice of permit action for noncompliance letter, Certified Delivery – Return Receipt Requested, documenting the repeat noncompliance and indicating that the permit is being canceled in whole or in part as appropriate to the circumstances. Bill for excess use at the unauthorized use rate.

2. Failure to Follow Management Instructions. The allotment management plan, annual operating instructions, or other management instructions for the land described on page 1, part 1 are part of the permit. The permittee must carry out the permit provisions, other instructions, or both as issued by the authorized officer for the area under permit, and require employees, agents, contractors and subcontractors to do likewise. Grazing Permit, Part 1, Section 3, Part 2, Section 8 (a-h).

a. Notice of Noncompliance and Opportunity to Remedy. Contact the permittee by phone or in person to notify them of the noncompliance, including what provisions of the AMP and/or AOI are in non-compliance, and require correction of the problems associated with the situation within 72 hours. Specify precisely what action is required to bring the permit back into compliance. Follow-up with a NONC documenting the verbal discussion including what parts of the Term Permit, AMP, and/or AOI are in noncompliance, what action is expected of the permittee to remedy the situation, to what standard, and by when.

b. Permit Action Decision Letter for Noncompliance. When documented inspection indicates that the initial noncompliance has not been remedied as specified, or if a second situation of noncompliance has occurred, contact the permittee by phone or in person describing the specific non-compliance and require correction within 72 hours or less. Follow-up with a notice of permit action decision letter, Certified Delivery – Return Receipt Requested, to the permittee indicating that a specified part of the permitted numbers or seasons is being suspended for a period of at least two years.

c. Repeated Offenses. When a documented inspection indicates repeated non-compliance with the AMP and/or AOI, send a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, documenting the repeat non-compliance finding and canceling the permit in full.

3. Failure to Maintain Improvements. The term grazing permit is issued and accepted with the provision that the permittee will maintain range improvements, whether private or Government owned, that are assigned to them for maintenance in the grazing permit. Grazing Permit, Part 2, Section 8(i) and Part 3.

a. Notice of Noncompliance and Opportunity to Remedy. When a documented inspection indicates non-compliance with requirements to maintain improvements to standard within specified timeframes, contact the permittee in person or by phone and describe the results of the inspection, and the provisions in the Term

Permit, AMP and/or AOI that are in noncompliance. Specify what action is required to remedy the noncompliance, to what standard, and within what time frame. Follow-up the personal contact with a letter indicating the specific instances of noncompliance, the provisions of the Term Permit, AMP and/or AOI which are in noncompliance, and specify what actions are required, to what standards and what timeframes. Document the inspection, with photographs if possible.

If maintenance is not completed according to specifications, and within specified timeframes, require the permittee to keep their livestock off or remove their livestock from the allotment, until maintenance is completed to standard.

b. Permit Action Decision Letter for Noncompliance. When a documented inspection indicates that the initial noncompliance has not been remedied as specified, or if a second offense has occurred, send the permittee a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested documenting the inspection and suspending 25% or more of the permitted numbers or season for a minimum of two years. Do not permit livestock on the allotment until improvement maintenance is completed to standard.

c. Repeated Failure to Maintain Improvements. Send a notice of permit action for noncompliance letter, Certified Delivery – Return Receipt Requested, canceling the permit in full.

4. Nonuse without Approval. Permits may be canceled, in whole or part, if the term permit holder fails to graze at least 90% of permitted numbers without obtaining approval for nonuse. Grazing Permit, Part 2, Section 9.

a. Notice of Noncompliance and Opportunity to Remedy. In the AOI, and during each year where permittee convenience non-use is requested and approved, document in writing to the permittee the requirements for stocking the allotment in the absence of approved non-use. This constitutes the opportunity to remedy. Where a documented inspection indicates that a permittee has failed to stock without first receiving approval of non-use, send a Certified Delivery – Return Receipt Requested, notice of non-compliance suspending for one year or more, the number equal to the authorized number not placed on the permitted area. Do not allow credit or refund of grazing fees paid.

b. Permit Action Decision Letter for Noncompliance. When documented inspection indicates that a repeat offense has occurred, or when the permittee fails to stock the permitted area after personal convenience non-use has been exhausted, send a notice of permit action for noncompliance letter, Certified Delivery – Return Receipt Requested, canceling the permit to the extent of un-approved non-use. Do not allow credit or refund of grazing fees paid.

5. Failure to Pay Grazing Fees – Failure To Pay By The Due Date Where No Livestock Have Entered National Forest System Lands. The permittee may not allow owned or controlled livestock to be on Forest Service-administered lands unless the fees specified in the Bill for Collection are paid. Charge interest, penalties, and administrative costs on any payment not made in accordance with 31 U.S.C. 3716 and 7 CFR Part 3, Subpart B and Grazing Permit, Part 2, Section 4 and 5.

a. Notice of Non-Compliance and Opportunity to Remedy. Contact the permittee by phone or in person, with a follow-up letter, and remind them that it is a permit violation, Part 2, Sections 4 and 5, if livestock are allowed to enter National Forest System lands before fees specified in the Bill for Collection are paid. Do not consider the violation willful, if the permittee can demonstrate that they made appropriate effort to pay the bill on time. Bill for appropriate interest, penalties, and administrative costs.

b. Permit Action Decision Letter for Noncompliance. If the noncompliance re-occurs, or has not been remedied as specified, contact the permittee by phone or in person specifying the noncompliance and the provisions of the Term Permit that are in noncompliance. Follow-up this contact with a permit action Decision Letter, sent Certified Delivery – Return Receipt Requested, suspending at least 25% of the permitted numbers or season for at least 2 years. Bill for excess use at unauthorized use rate and bill for appropriate interest, penalties, and administrative costs.

6. Failure to Notify Authorized Officer of Change in Qualifications to Hold Term Grazing Permit within a Reasonable Time (30 Days). Grazing Permit, Part 2, Section 11 (b).

a. Notice of Noncompliance and Opportunity to Remedy. Send a certified letter documenting the non-compliance, indicating specific terms and conditions of the permit that were violated. Request the permittee to remedy the situation by providing the required documentation within a specified time frame, normally 30 days.

b. Permit Action Decision Letter for Noncompliance. If the required information is not provided as specified, suspend 25% or more of the permitted numbers or season for a minimum of two years. Send a permit action for noncompliance letter, Certified Delivery – Return Receipt Requested, canceling the permit.

7. Conviction for Failure to Comply with Federal, State, or Local Laws. In cases where the permittee or the permittee's agents or affiliates are convicted for violation of Federal laws or regulations or State laws concerning animal control, protection of air, water, soil, vegetation, fish, wildlife, or other environmental values related to the grazing use authorized by the permit. Grazing Permit, Part 1, Section 3.

a. Notice of Noncompliance and Opportunity to Remedy. When documentation indicates that a conviction for failure to comply with appropriate Federal, State or Local Laws has occurred, send a Notice of Noncompliance by certified delivery

letter to the permittee, documenting the specific noncompliance. Offer the permittee the opportunity to provide rationale as to why administrative action should not be taken.

b. Notice of Permit Action for Noncompliance. Where the conviction is directly related to, and has a negative impact on, management of the area or resources under Term Permit, send a permit action Decision Letter, Certified Delivery – Return Receipt Requested, to the permittee documenting the specific facts regarding the non-compliance situation and cancel the permit.

8. Failure to Conform With Base Property Requirements. The permittee must notify the authorized officer if they dispose of the base property on which the permit is based. Grazing Permit Part 2, Section 7(b) and 11(b).

a. Notice of Noncompliance and Opportunity to Remedy. If the authorized officer finds that the permittee has failed to conform to base property requirements, the authorized officer shall provide written notice to the permittee that they have one year from the date that they ceased to own base property or the receipt of the NONC, whichever is earlier, to acquire replacement base property.

b. Permit Action Decision Letter for Noncompliance. If the permittee fails to provide the required documentation to prove ownership of suitable replacement base property after the specified one-year period, send the permittee a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, canceling the permit.

9. Failure to Validate the Grazing Permit. The issuance of a Bill for Collection, payment of fees, and actual turning on at least 90 percent of permitted livestock the first grazing season after the permit is issued will validate the permit for the number, kind, and class of livestock, grazing allotment, and period of use for the particular year. Grazing Permit, Part 2, Section 1.

Notice of Permit Action for Noncompliance. Unless specific circumstances indicated otherwise, this violation is considered to be willful and no opportunity for remedy is provided. When documented inspection indicates that validation has not occurred notify the permittee with a notice of permit action for noncompliance decision letter, sent Certified Delivery – Return Receipt Requested, explaining the noncompliance and stating that the term grazing permit is being cancelled to the extent that validation did not occur.

10. Grazing Livestock Not Owned by Permittee. Only livestock owned by the permittee are authorized to graze under the permit. Leased brands are not recognized as proof of ownership. Livestock purchased and subsequently sold back to the original owner, within a 24-month period is not considered evidence of valid ownership of the livestock. Grazing Permit, Part 2, Clause 7 (a) and (c).

Notice of Permit Action for Non-Compliance. Unless specific circumstances indicate otherwise, this violation is considered to be willful and no opportunity for

remedy is provided. When documented inspection indicates that grazing of livestock not owned by the permittee has occurred, call or meet with the permittee in person to explain the non-compliance. Indicate what parts of the Term Permit are in non-compliance and require full removal of the livestock, from NFS lands and/or submission of positive proof of ownership, within 72 hours.

b. Permit Action Decision Letter for Noncompliance. If acceptable proof of ownership is not provided within established timeframe, notify the permittee by notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, that the permit is being cancelled.

11. Making False Statements. If at any time after issuing a grazing permit, it is discovered that the permit was secured or maintained by deliberate misrepresentation or suppression of material facts, the permit may be canceled (Grazing Permit, Part 1, Section 3). When a term grazing permit was issued as a result of purchase of base property or livestock later found to be fraudulent or defective, and the new permittee had no knowledge of fraud or defect, a later discovery of defect shall not be cause for suspension or cancellation.

a. Notice of Permit Action for Non-Compliance. Unless specific circumstances indicate otherwise, this violation is considered to be willful and no opportunity for remedy is provided. During the issuance of the Term Permit, inform the permittee of the permit terms and conditions regarding false statements and what actions will follow if such occurs. If at any time, an authorized officer has reason to believe the information currently on record, in the form of grazing applications or supporting information supplied, does not reflect the actual situation, it is appropriate to ask the permittee to submit an updated application and supporting documentation. Establish a reasonable timeframe for furnishing of this information.

b. Permit Action Decision Letter for Noncompliance. If updated information provided by the permittee conflicts with previously furnished or other known information to the extent that the documentation shows that a deliberate misrepresentation has occurred, send a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, canceling the permit in whole.

12. Failure to Pay Grazing Fees - Allowing Livestock to Enter NFS Lands Before Paying Grazing Fees. The permittee must not allow owned or controlled livestock to be on Forest Service-administered lands unless the fees specified in the Bill for Collection are paid. Charge interest, penalties, and administrative costs on any payment not made in accordance with 31 U.S.C. 3716 and 7 CFR Part 3, Subpart B and Grazing Permit, Part 2, Section 4 and 5.

a. Notice of Permit Action for Non-Compliance. Unless specific circumstances indicate otherwise, this violation is considered to be willful and no opportunity for remedy is provided. Contact the permittee by phone or in person. Specify the

specific non-compliance and the provisions of the Term Permit that are in non-compliance. Require removal of the livestock within a specified timeframe and document in a NONC.

b. Permit Action Decision Letter for Noncompliance. Follow-up this contact with a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, canceling the permit in whole. Bill for excess use at the unauthorized use rate and bill for appropriate interest, penalties, and administrative costs.

13. Leasing the Permit. The permittee may not transfer, assign, lease, or sublet the permit in whole or in part, including the lease of base property or permitted livestock to some one else to allow the lessee to use the NFS grazing privilege. Grazing Permit, Part 2, Section 11(e).

a. Notice of Permit Action for Non-Compliance. Unless specific circumstances indicate otherwise, this violation is considered to be willful and no opportunity for remedy is provided. When there is documented evidence that the permittee has leased or sublet the permit as specified above, send a notice of permit action for non-compliance letter, Certified Delivery – Return Receipt Requested, to the permittee. Offer the permittee the opportunity to provide information to prove that the leasing has not occurred.

b. Permit Action Decision Letter for Noncompliance. If satisfactory evidence is not presented within the established timeframe to indicate that non-compliance has not occurred, cancel the permit.

16.5 - Mediation

Disputes regarding "grazing on National Forest System lands" are eligible for mediation under state mediation programs certified by the Secretary of Agriculture.

In order to participate in the mediation program, the dispute must have originated in a state whose mediation program has been certified by the Secretary of Agriculture. In addition, under the Secretary's regulations at 36 CFR 251, Subpart C, mediation is available only for decisions which result in the suspension or cancellation of term grazing permits, in whole or in part, based on: the permittee's refusal to accept modifications to permit terms and conditions (36 CFR 222.4(a)(2)(i)); the permittee's refusal or failure to comply with eligibility or qualification requirements (36 CFR 222.4(a)(2)(ii)); the permittee's failure to restock the allotment following the exhaustion of permittee convenience non-use (36 CFR 222.4 (a)(2)(iv)); the permittee's failure to pay grazing fees within established time limits (36 CFR 222.4(a)(2)(v) and (a)(3)); the permittee's failure to comply with applicable Forest Service regulations or grazing permit terms and conditions (36 CFR 222.4(a)(4)); the permittee's knowing or willful false statement in the grazing permit application (36 CFR 222.4(a)(5)); and the permittee's conviction for violation of federal or state laws pertaining to "protection of air, water, soil and

vegetation, fish and wildlife, and other environmental values when exercising the grazing use authorized by this permit (36 CFR 222.4(a)(6)).

When eligible, permit holders must request mediation in the notice of appeal filed with the reviewing officer. If mediation is requested, implementation of the agency decision is stayed pending the completion of the mediation. Mediation should be completed within 45 days, but an additional 15 days can be added to the process if it appears to the authorized officer that there is a potential to resolve the dispute by proceeding with the mediation process.

Additional information regarding the mediation procedure, see 36 CFR 251 Subpart C, 64 Federal Register 37843 (July 14, 1999), and 63 Federal Register 9987 (February 27, 1998).

16.6 - Cancellation to Devote the Lands to Another Public Purpose

Grazing permits may be cancelled in whole or in part where a decision has been made to devote certain National Forest System lands to another public purpose that precludes grazing by the permitted livestock. Except in an emergency, do not cancel a permit without a two-year notification (36 CFR 222.4(a)(1)). The permittee may waive the two-year notice requirement if he or she so chooses. Under FLPMA, permittees are entitled to reasonable compensation for the adjusted value of their interest in authorized permanent improvements on National Forest System lands which are to be devoted to another public purpose that precludes livestock grazing. See FSM 2240.

"Devote[ing] lands to another public purpose" includes projects that result in the transfer of lands out of the National Forest System as part of a land exchange. Where land exchanges are being considered, the authorized officer should notify the affected permittees in writing of the potential exchange as soon as reasonably practicable once the exchange appears likely. Scoping for the proposed land exchange may be an appropriate time to provide the permit holder with this notice. This early notice should provide the permittee with sufficient time to make alternative arrangements in the event that the exchange occurs. Since land exchanges may take several months or longer to complete, the authorized officer should periodically advise the permit holder of the status of the negotiations. For more information regarding land exchanges, see FSH 5409.13.

16.7 - Administrative Appeal of Decisions Involving Grazing Permits

Procedures for administrative review of grazing permit decisions are covered in 36 CFR 251, Subpart C and FSM 1570.